THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—19TH YEAR. SYDNEY, SATURDAY, SEPTEMBER 24, 1932. No. 13.

Table of Contents

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ORIGINAL ARTICLES— PAGE.
"Some Aspects of Gall-Stone Disease", by IAN HAMILTON, F.R.C.S. .. 375
"The Principles of a Normal Diet", by ROBERT S. STEEL, M.B., Ch.M., M.R.C.P. .. 383
"The Disappearance of Leprosy from Great Britain", by HARVEY SUTTON, M.D. .. 387

REPORTS OF CASES—
"Testicular Carcinoma of the Embryonal Type, with Notes upon the Prognosis of Tumours of the Testis", by IAN HAMILTON, F.R.C.S. .. 390

REVIEWS—
Urgent Medical Conditions .. 392
English Sanitary Law .. 392

NOTES ON BOOKS, CURRENT JOURNALS AND NEW APPLIANCES—
Scales for Diabetics .. 392

LEADING ARTICLES—
Squint and Sight Saving .. 393

CURRENT COMMENT—
Hæmophilia .. 394
The Heart in Hyperthyreoidism .. 395

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—
Pædiatrics .. 396
Orthopædic Surgery .. 397

BRITISH MEDICAL ASSOCIATION NEWS— PAGE.
Scientific .. 398
A Testimonial to Dr. C. H. Mollison .. 401

CORRESPONDENCE—
Medical History .. 401
Aleuchæmic Leuchæmia .. 401
"Avertin" .. 402
Poliomyelitis .. 402

OBITUARY—
James William Florance .. 402
George Redfearn Hamilton .. 403

PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—
Queensland .. 403

NAVAL, MILITARY AND AIR FORCE—
Memorial in Brisbane .. 403

UNIVERSITY INTELLIGENCE—
The University of Sydney .. 403

BOOKS RECEIVED .. 404

DIARY FOR THE MONTH .. 404

MEDICAL APPOINTMENTS .. 404

MEDICAL APPOINTMENTS VACANT, ETC. .. 404

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 404

EDITORIAL NOTICES .. 404

SOME ASPECTS OF GALL-STONE DISEASE.[1]

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THAT great master, both of the knife and of the pen, that most able of men, Wilfred Trotter,[(1)] in developing a thesis upon the use and value of the observational and experimental methods of investigation as applied to problems of medicine and surgery, advances the view that science would be sterile or would not exist unless to facts learnt by experiment or observation there were applied a vivid imagination in order that deductions might be drawn therefrom. He does not express it in so much language, but no doubt Trotter, with most of us, will concede that the first step in the study of any subject is to obtain a mastery over the facts appertaining thereto. As many of us find our memories short, it is not amiss to recapitulate some facts dealing with the anatomy and physiology of the biliary tract and with the history of the surgery of this all-important system.

History.

The history of the surgery of the bile apparatus, like the surgical history of so many things, dates almost entirely to the publication of Lister's immortal work on the antiseptic principle in surgery in 1867. That gall-stones have always been a source of great suffering to mankind may be accepted, as they are found in the Museum of the Royal College of Surgeons of England in Egyptian mummies of those who lived 2,000 years B.C. But how little the Egyptian, Greek, Arabian or European surgeons or physicians could do for the relief of

[1] Read at a meeting of the South Australian Branch of the British Medical Association on July 28, 1932.

the malady before 1867 may be gauged by their advocacy of massage and by the use of opiates for its relief. Petit, in 1733, suggested cholecystotomy for the removal of gall-stones, but it was not actually performed until 1867. Then in 1882 Langenbeck first performed cholecystectomy for cholecystitis, and at that time he gave as the indications for cholecystectomy, "dropsy", cholelithiasis and empyema of the gall-bladder. Greig Smith and others said that these indications for the operation were too wide. Jacobson,[2] a few years later, gave as the indications for cholecystotomy the occurrence of repeated crippling attacks of biliary colic and jaundice and "dropsy" and empyema of the gall-bladder. The operation was frequently done in two stages, the gall-bladder first being sewn to the anterior abdominal wall and later opened. Stones in the ducts were often crushed if they could not be removed otherwise. Lawson Tait was the first to perform cholelithotrity; and the operation of choledochostomy was regarded with terror by the surgeon and looked upon as an extremely hazardous procedure. By 1890 only forty-seven cholecystectomies had been recorded. However, during the last ten to fifteen years, with the more general spread of the knowledge of the symptomatology, anatomy and physiology of the system, more and more cholecystectomies are being performed.

Wilkie[3] divides the history of gall-bladder surgery into four periods: (i) The first operations performed by gynæcologists for large cystic abdominal tumours, these being taken for ovarian cysts. (ii) Operations for obstructive cholecystitis. (iii) In the third stage the operations were done because the patients had stones causing recurring attacks of colic, with or without jaundice. (iv) Finally, it was recognized that disease of the gall-bladder, due to pathological changes in the walls apart from stone, called for operation, and a number of patients were operated on because they had chronic persistent flatulent dyspepsia.

But even with the many technical improvements to aid the surgeon, operations on the bile tract are still often as difficult and hazardous as any in surgery.

Anatomy and Physiology.

The gall-bladder is a pear-shaped organ 7·5 centimetres (three inches) long, with a capacity of about fifty cubic centimetres. It lies on the visceral surface of the liver, in the groove adapted for it; occasionally it is suspended upon a mesentery, or it may be buried completely or incompletely in the liver substance. The larger end, the fundus, projects beyond the liver in the normal state and lies against the anterior abdominal wall, opposite the angle between the costal margin and the lateral edge of the right *rectus abdominis* muscle, and is covered with peritoneum. The anterior surface is adherent to the liver, while the posterior surface is clothed with peritoneum and lies against the beginning of the transverse colon below and the second part of the duodenum above. The neck narrows to form the cystic duct, which runs backwards and medially for 2·5 centimetres (an inch) and then joins the hepatic duct to form the common bile duct.

The hepatic duct, about 2·5 centimetres in length, is formed in the *porta hepatis* by union of the right and left hepatic ducts from the corresponding lobes of the liver. At its junction with the cystic duct it forms the common bile duct, which is 7·5 to 10·0 centimetres (three to four inches) long, and descends between the layers of the lesser curvature at its right free margin in front of the portal vein and to the right of the hepatic artery. Then it goes behind the first part of the duodenum, to the right of the gastro-duodenal artery, lying in a groove between the pancreas and the duodenum and ending in conjunction with the pancreatic duct at the ampulla of Vater, opening on an eminence called the *papilla duodeni*, where the sphincter of Oddi encircles it. The blood supply to the gall bladder is derived by the cystic artery from the right hepatic artery. The right hepatic artery arises normally by the bifurcation of the main hepatic artery in front of the portal vein and runs across behind the ducts, giving off the cystic artery opposite the cystic duct.

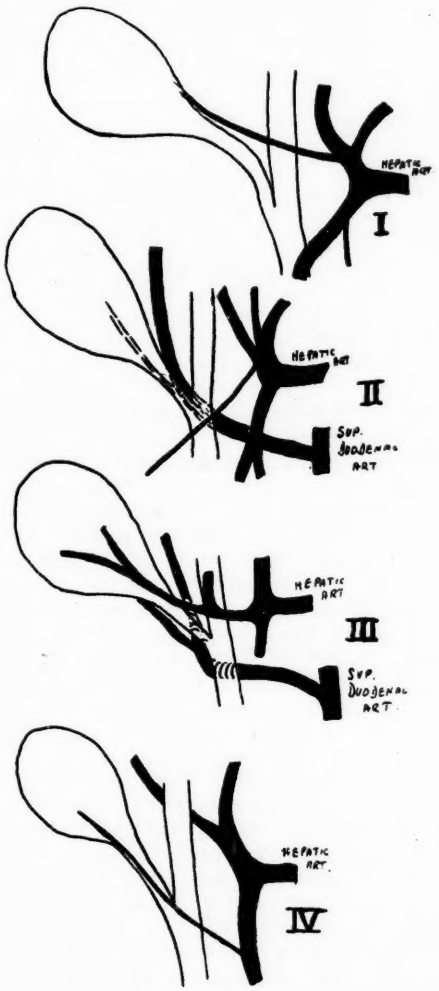
Those who rely upon the text book descriptions alone will certainly get into difficulties. The abnormalities of the vessels are too numerous to be remembered exactly, but too important not to be known. I recently made a series of thirty dissections upon the fresh bodies in the *post mortem* room at the Adelaide Hospital, and the most surprising variations were found. In the accompanying illustration are shown four characteristic variants. Number I shows the cystic artery having a normal origin and crossing in front of the hepatic duct; number II shows the right hepatic artery arising from the superior mesenteric and giving the cystic artery. Number III is similar, but a second cystic artery arises from a normal right hepatic artery. Number IV shows the cystic artery arising from the superior duodenal artery. My findings coincide in the main with those of other investigators, notably Flint.[4]

In one of these thirty dissections the cystic duct joined the left hepatic duct, the right hepatic duct joining about six millimetres (one-quarter of an inch) below.

Until I systematically dissected a number of bile ducts in the fresh corpse, I did not realize what a thick network of nerves surrounded these structures. They are so matted around the ducts that it is very easy to understand why such intense pain occurs during biliary colic.

The function of the gall-bladder is to act as both a reservoir for bile and as a concentrating organ. The beautifully folded mucous membrane is ridged and thrown up into villi-like processes, which are so similar to the villi of the duodenum that their function can be none other than an absorptive one. About a litre of bile is formed every twenty-four hours, and the gall-bladder bile is six to ten times

as concentrated as hepatic duct bile, water and possibly certain solids being absorbed by the mucous membrane of the gall-bladder. Expulsion of the bile from the gall-bladder begins five to thirty minutes after fatty foodstuffs, such as egg yolk, are passed into the duodenum. Whether the gall-bladder absorbs or excretes cholesterol is not quite decided, but Aschoff's pupils have performed experiments which seem to show that under normal circumstances neither process takes place. The valve of Heister is of great value, as by its conformation it insures that bile can pass in both directions.



The Symptoms of Gall-Stones.

The well known clinical picture of a fat multiparous woman of over forty years of age, who has had some indigestion and intolerance for fats for weeks, months or years, and who complains that she gets attacks of most severe colicky pain in the upper part of the abdomen, perhaps moving across from under the right ribs towards the mid-epigastrium, and sometimes felt at the point of the shoulder or even over a diffuse area of the scapula, accompanied by tenderness in the region of the gall-bladder and occasionally followed a few days later by the development of jaundice, is so well known an entity that every fourth year medical student could accurately describe it from the cases he has seen in the wards as a surgical dresser. But if this picture was the only one to which gall-stones gave rise and if gall-stones always gave this and no other picture, the difficulties of the diagnostician would be very much eased, and no doubt all those with gall-stones would soon have them removed. No, unfortunately the earlier symptoms of most patients with gall-stones are vague in the extreme, with few or no physical signs. Symptoms alone in abdominal diseases are notoriously deceptive, so that it is necessary to go very carefully into those arising from gall-stones.

The cholesterol solitaire, said to be present in about one-third of the cases (Aschoff[5]), generally gives no symptoms, but it may produce a definite and diagnosable symptom picture under certain circumstances.

As an illustrative case the following history may be quoted.

In February, 1931, an old woman of about sixty-eight years of age, a mother of several children, who could not remember having suffered from any digestive disturbance or abdominal trouble, was just finishing her luncheon one afternoon when she quite suddenly developed a most excruciating pain in the upper part of her abdomen. When I arrived to see her about ten minutes later, she was writhing in a chair, groaning loudly, and had vomited several times. An examination of her abdomen was made, but apart from a little generalized tenderness of the upper half of the abdomen and rigidity of the muscles of the abdominal wall as the spasms of pain came on, with absolute relaxation between the spasms, no physical signs were present. The pain passed off after a dose of morphine was given, and for about a week tenderness was elicited in the gall-bladder region; the tenderness gradually disappeared.

This was a case of cholesterol solitaire. No symptoms had been present until, by what means is quite unknown, the stone suddenly blocked the entrance to the cystic duct and gave rise to the clinical picture I have mentioned. In Moynihan's[6] experience, the agony of such an attack has been terrible, the patients feeling as though transfixed by a knife and being unable to breathe on account of spasms of the diaphragm. He has found that such attacks often have as sudden a cessation as a commencement, and it certainly would seem that when one meets with such an attack, it is so definite that the diagnosis of a cholesterol solitaire can be made with a fair degree of confidence.

But the common type of stones, those which I will describe to you as accompanying a cholecystitis, give much more indefinite symptoms and a less clearly defined clinical picture than this. The symptoms are nearly all referred to the stomach. This most sensitive of all organs calls out loudly enough when any of its neighbours is in trouble, and the gall-bladder is no exception. A dyspepsia arises, but is ill-defined in the early stages and is likely to be overlooked or treated without a diagnosis.

How many bottles of gentian and soda have all of us given to that most difficult patient who loses his appetite, with a feeling of distension and nausea after a few mouthfuls of food? Later, this feeling, which was only occasionally present, will become more persistent, with flatulence, belching and distension, and even vomiting in some cases. Then later, pain develops in the epigastrium, probably mild at first, sometimes severe and aching, with deep tenderness opposite the tip of the ninth costal cartilage. This is the picture of gall-stone dyspepsia, and it generally arises long before the patient suffers from crippling attacks of colic. Colic may never develop, and the condition may be so relieved by occasional medical treatment that the true nature of the complaint is discovered only at *post mortem* examination. How frequent this may be will be judged by the fact that 10% of people at *post mortem* examination have gall-stones (Hamilton[7]) and only 0·8% of hospital patients have an operation (Hamilton[8]) for this disease. All these symptoms are due to infection and may be present some time before gall-stones are formed; they are symptoms of cholecystitis. Women often have to loosen their corsets, a feeling as of "sea-sickness" with faint turns and salivation sometimes accompanies the dyspepsia; "water brasch" and "acidity" are often mentioned as present. But none of the symptoms is decisive, and it is rather by the persistence of the dyspepsia that it can be said that gall-stones are probably present. The complexion of these patients is often altered and will improve in a remarkable manner after cholecystectomy. I cannot conceive why this would be so, but I imagine that it may be due to the accompanying hepatitis, certain coloured substances being dammed back in the blood stream.

Pathology of Gall-Stones.

There are two fundamentally different kinds of gall-stone, the importance of which has not apparently been recognized by all writers. They are: (i) the non-inflammatory or metabolic, (ii) the inflammatory.

The Non-Inflammatory Stones.

In the first class there are two definite and distinct types, the radially built cholesterin stone and the pigment calcium stone.

The Radially Built Cholesterin Stone. The "pure" or radially built cholesterin stones contain only slight traces of protein and calcium. They have a coarse crystalline structure and occur singly in gall-bladders which usually show no signs of inflammation. They are occasionally found in persons who have never shown any signs of gall-stone disease. Aschoff[9] goes into an elaborate argument to show that these stones are non-inflammatory, and amongst English surgeons this is generally but not universally accepted. A hypercholesteræmia occurs during rapid loss of fat, pregnancy, following the ingestion of excessive amounts of fat, during the "lipæmia" of diabetes and in the premenstrual periods. The normal blood cholesterol is 0·15% to 0·2%, and it may rise to over 1·0% in some conditions, such as lipoid nephrosis. Most of the excess of cholesterin will have to be excreted in the bile, but not all those who have a transitory cholesteræmia will develop gall-stones. Probably the other main factor in the precipitation of the cholesterin is stasis, which may be brought about by lack of exercise, or by the dyskinetic process of the Continental surgeons. They postulate that, owing to the upright position of man and the peculiar conformation of the bile duct, kinking of the duct is liable to occur, or blocking by spasm of the circular muscular fibres may take place, leading to the varieties of "mucostase" and "cholestase". Bile having got into the gall-bladder, is held there, and water is absorbed out of it, while cholesterin, already in excess, is deposited.

However they are formed, single stones are present in the gall-bladder in 21·4% of patients with gall-stones in Adelaide, and early in the history inflammatory reactions are induced, as I have shown statistically.[8] The mode of this reaction is probably that the solitary stone slips over the entrance of the cystic duct and suddenly blocks the exit to bile, spasm of the musculature follows, jamming the stone down and bruising the mucous membrane. Then, as suddenly as it occurred, the block is relieved, but a traumatized area remains as a nidus for an ascending or a hæmatogenous infection. Cholecystitis results, and upon the solitary stone there will be an inflammatory deposition forming the combination stone. At the same time other inflammatory stones form in the gall-bladder, eventually giving the commonly seen condition of a chronically inflamed gall-bladder with one large combination stone and many smaller inflammatory stones packed round it.

The Pure Pigment Stone. The pure pigment stone is an uncommon type, comprising 4·3% of all stones (Aschoff). They are found commonly in cases of acholuric jaundice. The stones are hard and brittle, shatter to pieces on attempts to cut them, vary from the size of a grain of rice to that of a pea, and are usually mulberry shaped, rarely spherical or faceted, and composed of bilirubin calcium. Why they occur is quite unknown, but a convenient cloak for this lack of knowledge is the word "dyscrasic". The pure pigment stone can also block the cystic duct and induce infection, then becoming one variety of combination stone by secondary layering with cholesterin-pigment-calcium, so that two combination stones exist, the one built upon a nucleus of radially built cholesterin, the other upon a pure bilirubin calcium nucleus. The reverse, that is, layering of pure radial cholesterin or pure bilirubin calcium upon an infectious nucleus, does not occur.

The Inflammatory Stones.

Inflammatory stones are composed of cholesterin-pigment-calcium arranged in laminæ. The coarse radial crystals of cholesterin of the solitaires are absent, and it would appear that the mixture of the elements composing the stones is laid down at suc-

cessive stages upon a framework of protein. But how does the stone begin? I believe that there are several things which act in different cases as nuclei upon which the stones may form. Moynihan describes gall-stones as tombstones to bacteria. This may be so, and it has been shown that living *Bacillus typhosus* can be recovered from stones which formed following a typhoid cholecystitis or bile infection, sometimes many years previously. But this is not the only type. Most of these inflammatory stones are preceded by a cholecystitis of varying degree and an exudate rich in protein is poured out. While the cystic duct is occluded, stones cannot form, because cholesterin and pigment cannot find their way into the gall-bladder, but masses of inspissated epithelium and pus cells clump together and upon these the salts are laid down when bile once again flows freely. But most important amongst the modes of formation of the stones is that in which those beautiful pedunculated processes seen in strawberry gall-bladders become detached. These processes are laden with fat and it is easy to imagine how separation occurs when the filiform bases of these fat, heavy processes become any thinner than those we see in our microscopical preparations. Boyd[10] has developed the thesis of this mode of formation of gall-stones very fully.

Bacteriology.

The name of Rosenow[11] is always mentioned in connexion with the bacteriology of the gall-bladder, for in 1916 he isolated streptococci from the wall of the gall-bladder in 66% of specimens examined. Since then many investigators have attempted to solve the problem of infections in this organ. Judd, Mentzner and Parkhill[12] in 200 cases found the following organisms:

Bacillus coli communis	9 cases
Bacillus welchii	2 cases
Unidentified bacilli	13 cases
Staphylococci	17 cases
Green-producing diplococci	2 cases
Staphylococci + bacilli	3 cases
Diphtheroid bacilli	1 case
Streptococci	26 cases

Nichel and Judd[13] obtained positive cultures in 68% of those with a typical history of up to four months' duration, in 51% of those with over four months' duration, in 35% of those in whom the history was not decisively that of cholecystitis, and when a stone was present in the duct, 50% were positive. Williams and McLachlan[14] found that thick tarry bile was always sterile and white bile nearly always infected.

A general survey of the literature leads me to the opinion that between 30% and 40% of gall-bladders showing cholecystitis would give positive cultures from the wall or from the cystic gland, and that streptococci of the green zone type predominate, with *Bacillus coli* coming second. The bile itself inhibits many organisms from growing in it and with Rosenow one leans towards the view that most of the infections are blood-borne to the gall-bladder. At the same time, one does not forget the possibility of the other modes of infection, namely, ascending, hepatogenous, lymphatic in the gastro-duodeno-pancreatico-biliary lymphatic system, or that direct infection from the colon or duodenum may play some part. The fact that infection in the cystic gland runs parallel with that in the gall-bladder is of the very greatest importance to the surgeon, because this gland is easily palpable when infected, and its enlargement may be taken as a sure indication for cholecystectomy, because, even though the gall-bladder may not appear grossly diseased, cholecystitis is surely present.

However, infection gets to the wall of the gall-bladder; once it is there, it settles in, and soon the usual effects of inflammation follow. The inflammatory process may be acute or chronic and the cells found in the tissues will vary accordingly. Acute attacks occur probably in all cases, the gall-bladder walls become thickened, and neighbouring structures such as the duodenum or colon may become adherent to the bladder. This adhesion may sometimes be followed by ulceration of the stone through into the bowel, perhaps leading to gall-stone intestinal obstruction. Ulceration may even occur into the pelvis of the kidney, leading to renal colic due to a biliary calculus, or stones may ulcerate out on to the surface, giving rise to spontaneous biliary fistulæ. Infection sometimes spreads to the peritoneum, giving localized or spreading peritonitis. Empyema of the gall-bladder frequently occurs. Stones may be forced down the ducts, giving rise to cholangitis; or hepatitis may follow. Obstructive jaundice is a common sequel to this. These are grosser effects of gall-stones and cholecystitis. Several more subtle effects occur, and most important amongst them are chronic or acute rheumatism and atheroma of the vessels, with cardio-vascular degeneration, which may be very marked. Miller[15] recently called attention to this. Carcinoma of the gall-bladder occurs in some 4% to 5% of cases of cholelithiasis, and pancreatitis, acute or chronic, is one of the more serious complications. Acute pancreatitis occurred as a complication in 2·2% and chronic in 4·4% of Adelaide cases. Hydrops and mucocele of the gall-bladder are more rarely seen today, as patients are more often treated earlier.

Diagnosis.

The first idea to be dispensed with is that a history of jaundice or of colic is necessary to make a diagnosis. Such a history helps, and with it usually an accurate diagnosis can be made without accessory methods. But if jaundice and colic are awaited, serious complications may arise, such as hepatitis, pancreatitis, or cholecystitis, and certainly, if one definite attack has occurred, the most sceptical should bow to the obvious. Even with repeated attacks of colic and jaundice mistakes may be made, as the following case history will show.

On October 17, 1927, I was consulted by a typist, thirty-four years of age, who for fourteen years had suffered from recurring attacks of acute upper abdominal pain and had been jaundiced once. At least three of my predecessors

at Jamestown had said that the condition was gall-stones. The patient was somewhat neurotic and there was slight tenderness in the region of the gall-bladder. A fortnight later she had another severe attack. I did a laparotomy on the third day of the attack and was horrified to find a perfectly normal-looking gall-bladder with no calculi. The pancreas was hard. The appendix was normal. The gall-bladder was drained, and for some days thick tarry bile discharged freely, then normal bile. The wound healed soon after the tube was removed, and she had no more attacks, to my knowledge, for a couple of years afterwards.

The difficulties mainly arise in the earlier cases when dyspeptic symptoms alone exist. Tenderness in the gall-bladder region is then a valuable sign, but if any doubt remains to the clinician the accessory methods should be employed. They are: (i) simple X ray examination, (ii) opaque meals, (iii) cholecystography, (iv) the Lyon-Meltzer test.

Simple Radiography. It is only stones containing calcium which throw any shadow, and a shadow is said to be found in some 30% to 40% of cases in which stones are present. Actually, in Adelaide, in ninety-three such simple radiograms, seventeen showed the calculi, that is, 18·2% (Hamilton[8]). When a shadow is present, this is decisive and no further investigation is needed, but absence of shadow is still inconclusive. The typical radiological appearance of a gall-stone is the "wedding ring" appearance. Gall-stones must be distinguished from right renal stones, which, however, do not have this appearance, and in a lateral radiogram gall-stones appear anterior to the vertebral column; renal stones are superimposed upon it. They must also be distinguished from calcified glands, phleboliths and enteroliths.

The Opaque Meal. The opaque meal will help to exclude gall-stones if evidence is obtained of peptic ulceration sufficient to account for the symptoms. Otherwise, persistent deformity of the duodenum, either from an enlarged gall-bladder indenting it or from adhesions dragging on it, will assist in locating the site of the disease.

Cholecystography. Cholecystography is now firmly established, and its use is quite clearly understood. Brailsford[16] says that non-filling of the gall-bladder indicates in about 96% of cases a pathological condition of the organ, often accompanied by stones, though these might not be shown on the radiogram; poor filling on repeated examination also, in his opinion, indicates a pathological condition. He uses "Opacol" by the oral method. Rowlands,[17] Olch,[18] Muller,[19] McDowell,[20] Willcocks,[21] all express very much the same opinions. McDowell especially gives a very comprehensive paper from the technical and diagnostic point, and with a skilled radiographer experienced in this technique the chances of mistake should now be reduced to about 3%.

The Lyon-Meltzer Test. The Lyon-Meltzer test consists in passing an Einhorn's tube into the duodenum, preferably verifying that it is in the desired part of the alimentary tract by a radiogram, and after creating a free flow of bile by the injection of fifty cubic centimetres of a 25% solution of magnesium sulphate, in aspirating the bile and examining it microscopically and bacteriologically. With the marvellous improvement of Graham's test and the good results obtained it should be very rarely necessary to perform the Lyon test.

Treatment.

Treatment must be considered from the medical and surgical points of view.

Medical Treatment.

Medical treatment alone cannot dissolve or remove gall-stones and probably cannot cure cholecystitis, but in some cases gives so much relief that when operation is refused or contraindicated or postponed, a great deal can be done for the patients. There is no reasonable doubt that excess or errors of diet can cause an exacerbation in the symptoms of gall-bladder disease, so that in all cases the liver must be relieved of any excessive burden by restricting food to the smallest limit compatible with the maintenance of the patient in a state of good health and reasonable weight. Occasional purgation and free daily evacuation of the bowels are essential, and small daily doses of calomel, for example, 3·2 milligrammes (one-twentieth of a grain) often have a beneficial effect. All septic foci, such as diseased tonsils or carious teeth, should be treated appropriately.

For those in an acute attack, in addition to this, confinement to bed, a fluid but not necessarily too milky a diet, and hot applications to the hepatic regions, with the ingestion of large quantities of bland fluids, such as barley water, and free purging with the hydrogogues, such as sodium or magnesium sulphate, will generally secure relief. For biliary colic morphine should be given, but there one must utter the warning that this drug is very liable to mask peritonitis, and this has been seen in a number of cases.

In Case number 4136/1926 at the Adelaide Hospital[7] a woman of sixty-four years had six years previously had an attack of biliary colic. Then at 7 p.m. on July 15, 1926, she suddenly developed acute abdominal pain with vomiting and diarrhœa. She was given castor oil and morphine. Three further doses of morphine were given subcutaneously, in all 0·04 gramme (five-eighths of a grain), and *liquor morphinæ hydrochloridi* 0·45 mil (seven and a half minims) by mouth. When her pain was relieved she was sent to the Adelaide Hospital, twenty-four hours after the onset. She was jaundiced on admission. She was operated on at 9 p.m. on July 17, 1926, when a ruptured gall-bladder was discovered, with many stones in the peritoneal cavity, and general peritonitis.

This was a case of spontaneous rupture of the gall-bladder, apparently with no preceding inflammatory lesion, followed by peritonitis, the signs of which were masked for two days by large doses of morphine. The patient died that night.

Rolleston[22] recommends that at the same time a mixture containing hexamine, salicylate of soda, benzoate of soda, bicarbonate of soda, spirits of chloroform and infusion of cloves should be given three times day. The hexamine removes infection of the gall-bladder, and the salicylate of soda is a cholagogue. Should urinary tract irritation occur, large doses of citrate of soda relieve it by prevent-

ing the formation of formaldehyde in the urinary tract. The mixture should be continued for six weeks after an attack. When the attack passes off, the free flow of bile should be encouraged by frequent small meals and exercise, and foods which tend to favour bile calculi formation, for example, egg yolk, brains, fats, butter, stewed and dried fruit, sweetbread, liver, kidney and green peas, should be avoided.

This treatment would also be appropriate for those patients awaiting the subsidence of acute symptoms before an operation is performed.

Non-Surgical Drainage. The Lyon-Meltzer test has been previously mentioned in regard to the diagnosis of gall-stones and cholecystitis. The same technique again comes up in treatment. An Einhorn tube is passed into the stomach and then slowly paid out to the twenty-eight and a half inch mark, and then sixty cubic centimetres of a 25% solution of magnesium sulphate are injected into the duodenum. A free flow of bile follows, and it has been found that this results in relief of symptoms, and some even think that the pure cholesterol calculi may be dissolved by the promotion of frequent changes in the bile in contact with them.

The Surgical Treatment.

Three surgical procedures have now become standardized, and the indications for each are moderately clear. They are cholecystectomy, cholecystostomy and cholecysto-gastrostomy or duodenostomy.

In regard to internal cholecystostomy, cholecysto-gastrostomy, -duodenostomy or -colostomy, the easiest and undoubtedly the safest of these operations is that of cholecysto-gastrostomy. Gatewood and Lawton,[23] upon an experimental basis, recently came to the conclusion that infection of the liver and biliary tract invariably follows cholecystenterostomy, but it would seem that this should not contraindicate the operation when it is necessary and possible, because these systems are already infected, and when the experiments are done in healthy dogs, the effects of the infection are very mild. Robinson's[24] observations tend to show that hepatic infection does not occur after cholecystenterostomy, so that the question appears still quite unsettled. One can say that most observers agree that this operation is needed in cholelithiasis associated with pancreatitis, and further indications might be taken from Robinson's conclusions that short circuit operations are indicated whenever obstructive changes are present or suspected or likely to supervene in parts of the biliary tract other than the gall-bladder. With a comparatively healthy gall-bladder it is the operation of choice in cholangitis, in stricture or where the head of the pancreas is found to be hard; and Steele[25] goes so far as to report the results in one hundred consecutive cases in which internal drainage was done as a routine, amongst them being fifty-four cholecysto-duodenostomy and forty-six cholecysto-gastrostomy operations. There was no operative mortality, but two patients died later. His follow-up showed that 79% of patients obtained permanent relief, the condition of 12% was improved, and 6% had recurrent dyspeptic symptoms. He concludes that the mortality is less and the recurrence rate less than after cholecystectomy, and he regards it as the operation of choice when the gall-bladder is infected.

Cholecystectomy. Many observers have come to the conclusion that cholecystectomy is superior to cholecystostomy in the treatment of gall-stones and it appears to be the routine operation of choice almost universally. Certainly there are surgeons who still advocate cholecystostomy, mainly upon the grounds that in many cases there are no macroscopical signs of severe disease of the gall-bladder and that if further trouble occurs it is no reproach to have to reoperate and perform cholecystectomy. From a pathological point of view I believe that it is a reproach to leave an organ, the removal of which does no harm to the patient, for apparently the bile ducts undergo adaptive changes (Sutton[26]). On the other hand, leaving it *in situ* may lead to serious and severe complications should the disease not be cured by simple drainage, such complications as carcinoma of the gall-bladder, peritonitis, pancreatitis, hepatitis and general arterial degeneration. It is also necessary to realize that secondary operations carry a greater mortality than primary operations.

Sanders[27] found that with cholecystectomy 84% of patients were completely relieved and that all his most disappointing cases occurred after cholecystostomy. He found that in thirteen series of 4,032 cases in which cholecystectomy was performed by others, the operative mortality was 4·73%. Walton[28] found that in 574 cases there were twenty-eight recurrences, of which twenty-two were in the gall-bladder after cholecystostomy. He always does cholecystectomy now, because it gets rid of the factory for gall-stones and allows easier exploration of the ducts. Deaver and Bortz,[29] Sherren,[30] Moynihan,[6] Rowlands,[31] all appear to employ cholecystectomy as the routine operation, doing cholecystostomy only as a life-saving measure when cholecystectomy would be dangerous. Some of them suggest that in these circumstances, when the acute condition has settled down, perhaps after two or three weeks, cholecystectomy should be done. Barling[32] makes cholecystectomy his routine procedure because: (i) the gall-bladder is always infected, and it is doubtful if the infection is cured by drainage; (ii) absence of the gall-bladder is not harmful; (iii) recovery is quicker and easier after this than after cholecystostomy; (iv) infection of the wound is less likely and the scar is firmer; (v) removal does not add to the risk.

Several authors point out that for those whose inteference with the biliary organs is to be occasional, the safer operation is cholecystostomy. Several methods have been invented to repair the results of accidents to the bile ducts. The incision employed for this operation depends almost entirely upon the individual operator. Kocker's, Perthes's,

Mayo-Robson's, Morrison's and mid-line incisions all being used. Those who still employ the original method of stripping the gall-bladder from the liver and then clamping the cystic duct and vessels together just on the duct side of Hartman's pouch, will be able to employ a much smaller incision than those who carefully dissect out and define the junction of cystic, hepatic and common ducts and the cystic artery before putting a clamp upon anything. The modern tendency is to drop the first method, although it is quicker, and to employ a right paramedian supraumbilical incision, because it gives a good access to the ducts, does quite well for dealing with other lesions, such as duodenal ulcer or gastric ulcer, should the diagnosis have been wrong, and it can be extended down to the hypogastrium without doing any harm should extension be needed. In clamping the ducts and vessels, a curved clamp of the Moynihan type should be used, so as to avoid tearing other structures; such tearing has occurred with straight clamps. No abdomen should be closed without a thorough exploration of all the organs, and after cholecystectomy a drainage tube should always be put down to the stump of the cystic duct in case of bile leakage into the peritoneal cavity.

The results after cholecystectomy are good, though not faultless. Ross[33] gives the results at the Liverpool Royal Infirmary as: completely cured, 82·4%; relieved, 10·5%; unimproved, 7·01%. He gives no distinctive figures for the various operations or the various morbid conditions, but he states that the absence of stones renders the chance of a cure perceptibly less. Sanders[27] reports 84% of cures in five hundred cholecystectomies.

Cholecystostomy. The indications for cholecystostomy have now been narrowed down very considerably and may be epitomized thus (Ogilvie[34]):

1. In a case of a single cholesterin stone in a bladder whose walls appear to be normal and healthy.
2. In mild infections of the liver, bile passages and pancreas.
3. As a measure preliminary to operations for obstruction in the common duct and preliminary to cholecystectomy in patients who are acutely ill with cholecystitis and cholangitis.
4. In acute gangrene of the gall-bladder due to a stone impacted in the cystic duct.
5. When previous acute attacks have left extensive and dense adhesions which make exposure of the ducts very hazardous.
6. When obstruction of the common duct might be expected at a later date, either from an impacted stone with ulceration at the site of impaction or from fibrosis of the head of the pancreas.

Though it sounds as if there were many indications for cholecystostomy, I emphatically hold that the great majority of patients with gall-stones should be treated by cholecystectomy.

Early Operations for Acute Cholecystitis. Occasionally the expectant treatment for acute cholecystitis fails; rupture of the gall-bladder, adhesion to neighbouring structures with ulceration into them, or spreading peritonitis may occur, often with fatal results.

From this it appears that in order to avoid loss of life all patients with cholecystitis ought to be submitted to urgent or emergency operation, just as for acute inflammation of the appendix. The great tendency to localization in the gall-bladder region, and the difficulty of operating in the presence of œdema and inflammation around the ducts have prevented general adoption of early operation, but several competent and reliable surgeons advocate it, and it should be realized that if operation were done early in the attack the mortality would be reduced. Rowlands[17] states that the mortality is under 2%, that convalescence and the length of hospitalization will be lessened, and that fewer cases of gangrene and empyema of the gall-bladder, with all their accompanying risks, will be seen.

The following is an illustrative case.

Late on July 26, 1926, I was called to see a man about forty-five years of age, a carrier, who was convalescing from an injury to his chest. He complained that acute and severe pains had come on and were present in the region of the gall-bladder, that is, in the patient's words, across the upper part of his stomach. He had vomited. He appeared to be in great distress, and there was slight tenderness in the gall-bladder region. Morphine, sixteen milligrammes (one-quarter of a grain) relieved him somewhat, but early next morning I was again asked to see him. The pain was much worse—quite unbearable. More morphine eased him while he was prepared for the operation, which was done early that afternoon. The gall-bladder was found packed with stones and very tightly contracted on them. It was in a condition of early acute inflammation. I performed cholecystectomy with no difficulty, and apart from a mild post-operative bronchitis, convalescence was uneventful and the patient went home in eighteen days and started work a fortnight later. He was well two years afterwards and had had no return of his chronic dyspepsia.

Had the recovery from the acute attack been awaited before operation was performed, at least two weeks would have been lost, added to which there would have been the serious anxiety for a few days about which way the intraabdominal condition would go. With respect to the pulmonary complications, although only a mild post-operative bronchitis was noted in this case, serious pulmonary complications are not infrequent. In the *post mortem* room at the Adelaide Hospital two cases of massive collapse of the lung following cholecystectomy have recently been seen. Montague Dixon[35] states that, following the belief that post-operative atelectasis is a manifestation of allergy, he has made a routine of giving 0·3 gramme of peptone as a desensitizing dose fourteen hours before every laparotomy, with startlingly good results.

The treatment of those with cholæmia has always been an important and difficult question. Many patients, when put to bed and treated medically, will show signs of diminishing jaundice, and these should be treated conservatively and allowed to recover completely from the jaundice before being operated upon, if recovery occurs in a reasonable time. Action is forced sometimes by other circum-

stances, or the jaundice fluctuates day by day, but shows no signs of passing away, and then operation is required. The liver suffers by back pressure of bile with such obstructive jaundice, and every effort should be made to relieve it of strain. Copious fluids, alkalis and glucose should be given freely the night before the operation, and if the bleeding time of the patient is more than twice the normal, calcium in considerable quantities (five cubic centimetres of a 10% solution of calcium chloride given intravenously for three days before) or a small blood transfusion, or both, should be given, as these patients are liable to hæmorrhage. Chloroform is strictly contraindicated, the most satisfactory anæsthetic being either ether given by the open method or a local anæsthesia. Should post-operative hepatic insufficiency occur, it may be one of two types (Ogilvie):

1. Failure of liver function, in which, three to eight days after operation, the bile drainage becomes pale, thin and copious; while jaundice does not perceptibly lessen, there is restlessness, prostration and vomiting and progressive weakness, finally leading to death.

2. Renal failure secondary to hepatic failure, in which the bile discharge is greatly reduced or ceases, jaundice rapidly deepens, the pulse becomes slow, drowsiness passes into coma, and this in its turn gives place to death. A progressive rise in blood urea occurs.

In these cases the treatment recommended is the continuous intravenous instillation of a 5% to 10% solution of glucose in saline solution, about 4·5 litres (eight pints) being given in twenty-four hours. After 450 to 600 cubic centimetres (fifteen to twenty ounces) of a 5% solution have been given insulin is administered at intervals in suitable doses. This will keep dogs whose liver has been removed, alive for twenty-four to thirty-six hours. I have not heard of its use, but it would possibly be practicable or useful to bleed and replace the loss by a transfusion of fresh blood.

Acknowledgements.

I wish to acknowledge my indebtedness to the surgeons at the Adelaide Hospital who allowed me to use their case records for a recent thesis, certain points from which I have used in this paper; to Professor J. B. Cleland, who allowed me to dissect bodies before the *post mortem* examination; and to Mr. Barbour, of the fourth year in the Medical School, for making two beautiful dissections of the biliary system.

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THE PRINCIPLES OF A NORMAL DIET.[1]

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THROUGH long years of experience a custom has developed which determines the kind of food to be eaten by the people of various countries. As a general rule, this custom is a safeguard and prevents the individual from falling into serious dietetic errors. If an adequate supply of food is available, the normal person will consume enough

[1] Read at a meeting of the Medical Science Club, Sydney, on March 8, 1932.

to satisfy the caloric requirements of his body, but that does not necessarily mean that the diet will be properly balanced, or that it will contain adequate vitamins and salts.

A diet is a mixture of foodstuffs, and "a foodstuff is a material capable of being added to the body substance, or one which, when absorbed into the blood stream, will prevent or reduce the wasting of a necessary constituent of the organism" (Lusk).

Voit says:

The ideal food is a palatable mixture of foodstuffs arranged together in such proportion as to burden the organism with a minimum of labour.

Total Caloric Requirements.

Rubner formulated a law that the metabolism is proportional to the surface area. We know that the basal metabolism is constant, and we may say in general that the heat requirement of an individual varies according to height, weight, age, sex and activity. The total caloric requirements, then, should include the basal reqeuirements of the body, *plus* 10% for the specific dynamic action of foods, *plus* 10% to 30% or more for activity in work and movement.

Sundstroem states that in North Queensland the average basal metabolism of males is 22% below and of females 25% below the usual figures. Working in Sydney with students, who can be regarded more or less as trained subjects, Hindmarsh found an average reduction of 8·9% for men and 10·5% for women, when compared with the Du Bois predicated values.

Composition of Foods.

Food consists of various nutritive substances or foodstuffs, which are: (i) carbohydrates, (ii) proteins, (iii) fats, (iv) salts, (v) vitamins, (vi) water. In addition, one finds colouring matter and flavouring agents, for example, extractives and volatile oils.

All foods are essential for healthy nutrition, since each has its own particular functions to perform in the body. Carbohydrates, proteins and fats are the heat- or energy-producing foods. Rubner has shown that one gramme of carbohydrate yields 4·1 calories, one gramme of protein yields 4·1 calories, and one gramme of fat yields 9·3 calories to the body when oxidized.

Proteins.

The value of proteins in nutrition depends upon their constituent amino-acids, and the kind and number of amino-acids determines the nutritive value of a protein. They are of high or low biological value according to the completeness of supply of the amino-acids. Of high biological value is the protein of milk (casein), since milk contains all the necessary amino-acids. Meat is similarly of high value, and McCollum gives the chief animal substances eaten as kidney, liver and muscle meat in order of their biological value. Plant or vegetable proteins, such as wheat, oats, peas and beans, are of low biological value. In each case one or more amino-acids is present in inadequate amounts, but a suitable mixture of two vegetable proteins results in a high biological value, for example, cereals and leguminous vegetables. Gelatin lacks cystin, tyrosin and tryptophan, and, although a protein "sparer", cannot replace true protein foods. Proteins are necessary in the food (i) to permit of growth in the growing individual, (ii) to replace the wastage of protein in the "wear and tear" of the body (Rubner), and (iii) for milk production in the female.

In the process of the metabolism of protein in the body, 58% passes through the glucose stage and is available for use in the production of energy. Fat may also be formed from the ingested protein. These facts should influence us in determining the total daily intake of protein. I believe that hard muscular work does expend some of our body protein and that a heavy worker requires proportionately a greater protein allowance than a sedentary worker.

A "repair quota" is necessary in the adult, and a figure of 1·0 to 1·5 grammes of protein per kilogram of body weight is usually accepted as a just allowance, that is, about 75 grammes a day. A "growth quota" is further necessary in the growing individual, and a child requires at least two grammes of protein per kilogram of body weight. An "improvement quota" is required in the convalescent person when there has been a previous negative nitrogen balance. Nitrogen equilibrium cannot be adequately maintained without carbohydrate in the diet.

Carbohydrates.

Physiologically and financially the carbohydrates are the most economical foodstuffs. They are the most readily available for use by the body when absorbed into the blood, and are oxidized to the exclusion of fat if too much is ingested.

Carbohydrates are protein-sparing and make it possible to establish nitrogen equilibrium at a lower level than when protein alone or protein and fat together are ingested. If more carbohydrate is eaten than is required for the body needs, it is converted into fat and stored in the body.

Voit's standard diet allows 500 grammes of carbohydrate, or 67% of the total number of calories. This is only a guide, however, and must not be regarded as a fixed proportion.

Carbohydrates are widely distributed throughout the vegetable kingdom, but they may not be available to the body in their natural state. (The carbohydrate of milk is in the form of lactose, a disaccharide, which is readily converted into glucose and galactose during the process of digestion.)

Fat.

For the proper metabolism of fat the simultaneous oxidation of glucose is necessary. This is probably the chief reason which leads us to eat bread with butter. One gramme of glucose is necessary to oxidize 1·5 grammes of fatty acid, and the total fat in the diet may amount to twice the quantity of carbohydrate *plus* half the quantity of protein.

Fat relieves the intestinal tract of the necessity of dealing with an excessive amount of carbohydrate which would be necessary to make up sufficient calories in a diet. Those fats which melt at the temperature of the body are the more easily assimilated. The satiety value of a meal is increased by the inclusion of fatty foods, since they leave the stomach slowly.

It will be seen already that the best diet is one which contains a mixture of foodstuffs. It is suggested that a normal balanced diet should contain approximately 15% of the total calories as protein, 25% of the total calories as fat, and 60% of the total calories as carbohydrate.

Inorganic Salts.

Inorganic salts are essential in a normal diet, and with a liberal supply of fresh foods—milk, fruit, vegetables and meat—they will be adequately provided, except sodium. For the average man the addition of about two grammes of sodium chloride is necessary per day.

The mineral elements have three chief functions: (i) They contribute to the bony structure of the body; (ii) they form many organic compounds, such as nucleoproteins and phosphatids; (iii) they circulate in the body fluids as inorganic salts, dissociated ions and in organic combinations.

Phosphorus.—The amount of phosphorus required daily by an adult is 0·8 to 1·5 grammes, but a child requires at least twice as much. Phosphorus is found in walnuts, milk, oatmeal, eggs, beef, dried beans and peas.

Calcium.—The amount of calcium required daily is 0·75 to 1·0 gramme (Sherman and Rose). Milk is a valuable food by reason of its high calcium and phosphorus content, and is of value to the adult as well as to the child. The calcium of milk is more readily utilizable than that of the fruits and vegetables. Lettuce, celery, spinach and carrots are a good source of this salt, but meat and cereals are not rich in calcium.

Iron.—The amount of iron required daily is 0·015 gramme (Sherman). Milk is poor in iron, but meat, eggs, spinach, oatmeal and prunes are rich in it.

Other elements necessary to a normal diet are potassium (found in olives, prunes, beef, tomatoes, cabbage *et cetera*), magnesium (found richly in cocoa, almonds, beans *et cetera*), sodium (found in carrots, oysters, celery, raisins, eggs *et cetera*), sulphur (found in beans, eggs, cabbage, meat *et cetera*), chlorine (found in cheese, bananas, meat *et cetera*), and iodine (daily requirements, one milligramme, found in vegetables, sea foods and water).

Vitamins.

Vitamins are essential to a normal diet and are adequately supplied by a normal intake of fresh foods and the addition of sunlight.

Vitamin A.—Vitamin *A* is fat-soluble and is concerned in growth and the prevention of xerophthalmia. It is found abundantly in cod liver oil, eggs, butter and milk. The leafy vegetables contain more vitamin *A* than the root vegetables.

Vitamin B.—Vitamin *B* is water-soluble, and for this reason the boiling of vegetables robs them of a good deal of this vitamin. Vitamin B_1 is anti-neuritic or beri beri preventing; vitamin B_2 is pellagra preventing. Vitamin *B* is abundant in yeast, whole meal, cabbage, spinach, prunes and milk. There is very little of it in apples and pears, and none in beer.

Vitamin *C.*—Vitamin *C* is scurvy preventing and is found in fresh vegetables, tomatoes, lemon juice, cabbage and potatoes; but there is little or none in beef. The body has only a limited capacity for storing vitamin *C*, and it is necessary to renew the supply frequently.

Vitamin D.—Vitamin *D* prevents rickets, but sunlight has some effect in this also. It is found in cod liver oil and butter, but is not present in the vegetable fats.

Vitamin E.—Vitamin *E* is found in eggs, meat, cereals, lettuce, and is concerned in reproduction and aids in the assimilation of iron.

Water.

Water is supplied to some extent in all the foods we eat, but it is necessary to augment this supply. It is the vehicle which transports the nutritive elements to, and removes the waste products from, the cells.

Requirements of a Normal Diet.

1. The diet must be of sufficient bulk to satisfy the normal appetite.
2. Foods which have good satiety value should be included.
3. The fuel value must be sufficient to maintain the normal weight of the individual (Smith).
4. The proteins must be adequate for growth or maintenance.
5. A careful balance should be maintained between the food elements.
6. The diet should be fairly evenly distributed between the three meals of the day.
7. The residue or bulk of the diet should be sufficient to produce at least one normal bowel movement daily.
8. The mineral salts should be sufficient for body needs.
9. There should be an abundant supply of vitamins.
10. The food must be palatable and economical from a dietetic aspect.

Discussion.

The requirements of a normal diet may be discussed under their several headings:

1. Food must be of sufficient bulk to satisfy the normal appetite. If the diet fails to satisfy the normal appetite although it contains the required number of calories, it leads to much discomfort in the individual and this in turn will lead to

overeating in order to satisfy the craving of hunger. A little readjustment of the foods will provide those of more bulk without increasing the caloric intake. In the normal person the appetite is a fairly good guide to his total requirements, but that is no sure indication that the diet will be adequate in salt and vitamin requirements.

One patient, a baker, satisfied his appetite by eating the products of his own bakery—bread, rolls, buns—and in time developed pellagra through lack of vitamins and animal proteins. He recovered after a considerable period of dietetic treatment with foods of high vitamin and high protein content.

2. Foods which have good satiety value should be included. The satiety value of a food depends upon the rapidity with which that food leaves the stomach and upper intestine. A sense of satisfaction and well-being is experienced, particularly from those foods which remain longest in the stomach, and this sensation is sustained by those foods which pass more slowly along the small intestine. The satiety value of an article of diet is measured: (*a*) by the length of time the food remains in the stomach, and (*b*) by the amount of gastric juice stimulated by it. Meat is of high value in this respect; next, milk, cream, eggs, butter, and olive oil. Cooked eggs are of greater satiety value and are more easily digested than when raw. Fish is of lower satiety value, except eel and other fish rich in fat. Bread and potatoes by themselves are of low satiety value, but when taken with meat or butter they greatly increase the satiety value of a meal. Sweets increase the satiety value; hence the value of the sweet course and sugar in the meal. Green vegetables, despite their bulk, are relatively low in their satisfying qualities.

3. The fuel value must be sufficient to maintain the normal weight of the individual. It is evident that if an individual increases in weight on a certain diet, he is taking food of too great a caloric value; and also, if there is a loss in weight, the diet is of insufficient caloric value. (An obese but otherwise normal individual often wishes to reduce in weight, and a loss of one to two pounds per week is quite sufficient. More rapid reduction in weight is depressing and promotes a feeling of weakness.) Under normal conditions the caloric intake and the expenditure of energy are in such a perfect state of balance that the adult body weight remains the same over a period of a number of years.

4. The proteins must be adequate for growth or maintenance. Proteins are necessary for growth and also to replace what is used up by the "wear and tear" of the body. In the adult 1·0 to 1·5 grammes, and in the child 2·0 grammes per kilogram of body weight daily are necessary. If insufficient protein is taken in the diet there is a nitrogen loss from the body through metabolism of body proteins. About 75 grammes of protein daily is a good guide for the diet of a normal adult, and animal proteins are more economical for the body than vegetable proteins. Meat, milk and eggs supply most of the proteins in our diet. Experiments show that there is a nitrogen lag in the case of egg white, which may be due to the retention of "deposit protein", and there is also a sulphur retention which indicates the production of new muscle tissue (Wilson).

The increase in metabolism by ingestion of proteins is greater than that with any other food and, as a general rule, we probably eat too much meat for our hot climate.

5. A careful balance should be maintained between the food elements. A guide to the percentage composition of carbohydrates, proteins and fats in a normal diet has already been given as 60%, 15% and 25% respectively. Wardlaw found the average daily food consumption of Australian students to be: protein, 63·6 grammes; fat, 74·9 grammes; carbohydrate, 245·9 grammes. This is about 13·3% protein, 35·4% fat, and 51·3% carbohydrate. Carbohydrates are protein-sparing, and are necessary for the combustion of fat in the body, and all three foodstuffs are essential parts of a diet. The economical factor and dietetic prejudices often alter the given proportions, which may vary over a considerable range but still keep within the bounds of normality.

6. The diet should be fairly evenly distributed between the three meals of the day. Either by habit or design, many people fail to eat an adequate breakfast. They are often in a hurry to catch a certain tram or train and do not give themselves time to eat what should be one of the most important meals of the day. Then luncheon frequently consists of a few sandwiches, or something very light from a dietetic point of view, and is often eaten in a great hurry. This makes the evening meal, usually dinner, a very heavy one, which is physiologically incorrect. Time and food should be more evenly distributed than they usually are.

7. The residue or bulk of the diet should be sufficient to produce at least one normal bowel movement daily. Foods which are wholly absorbed cause constipation, and the indigestible substance, the cellulose, of vegetables and fruits is necessary for distension of the bowel and production of the normal stimulus which leads to evacuation. As far as possible, fruits should be eaten with the peeling. Of high cellulose value are grapes, peaches, blackberries, strawberries, apples, spinach, sweet potatoes, cabbage, carrots and ordinary potatoes.

Three servings of vegetables and three of fruit, in addition to potatoes, should be the minimum allowance for the normal adult.

The overloading of the intestine with the rougher vegetables and bran, in the case of the vegetarian, is not infrequently harmful and productive of chronic diarrhœa.

8. The mineral salts should be sufficient for body needs. A balanced diet, adequate supplies of fruits and vegetables, with the addition of about two grammes of sodium chloride daily, will cater for the mineral requirements of the body. Fresh foods, raw fruit and uncooked vegetables, for example, lettuce, celery, tomatoes, will supply these abun-

dantly. Boiling vegetables and discarding the water in which they are boiled robs us of some of these salts. If the water is kept for making soup, the salts from the vegetables are not lost to the body.

9. There should be an abundant supply of vitamins. Fresh foods and sunlight will adequately supply the necessary vitamins. Vitamin deficiency is a real and not an imaginary thing, and may occur in our midst through improper diet.

10. The food must be palatable and economical from a dietetic aspect. Unless foods are acceptable to the palate, disgust and loss of appetite result in loss of weight. Cooking alters the physical state of a food, renders it more palatable as a rule, and more easily digested. The proteins of meat are coagulated, the fibrous tissues softened, and it is rendered more attractive and appetizing. The starch grains are broken up and the cellulose is softened in the vegetables.

As far as possible the natural flavour of the food should be preserved, and the moderate use of spices and condiments is of value in promoting gastric secretion. On this account, too, soup at the beginning of a meal is of value by virtue of the extractives from meat.

Cooked oysters are far less digestible than raw.

Poultry does not differ materially in nutritive quality from ordinary meat. The same may be said of fish; the protein is about the same, the fat content less, but it is more easily digested.

The food value of white and brown bread is practically the same. The chief difference is the presence of roughage in the brown bread.

An unripe banana is of practically no food value to the body, since it is excreted without being absorbed, but a thoroughly ripe banana in which the starch has been converted to glucose, is completely digested.

Drinking with meals is in no way harmful to the individual, providing the beverage is not used to wash down incompletely masticated food.

Celery or raw apple is of considerable value at the conclusion of a meal, to cleanse the mouth and to give a sense of satisfaction to the individual.

SKELETON DIET.

A "skeleton diet", to which any other foods may be added, is outlined for daily use by the normal person:

100 grammes potato (two heaped tablespoonfuls)	1 pint milk
300 grammes vegetables	1 egg
300 grammes fruit	1 ounce butter
75 grammes meat	1 serving cereal (Smith)

This skeleton diet already contains adequate vitamins, salts and bulk for bowel residue for a normal person. The total caloric requirement is reached by the further addition of food as desired.

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THE DISAPPEARANCE OF LEPROSY FROM GREAT BRITAIN.[1]

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HISTORY has concerned itself with the rise and fall of empires. Not less important and just as striking has been the rise and fall of epidemic diseases. While in dealing with battle, murder and sudden death our data are unquestionable, information is less clear and detailed concerning famine and pestilence. The embryonic state of medical science makes it difficult and even at times impossible to attain a correct diagnosis of many of the great plagues that have from time to time decimated human populations. The leprosy of the Old Testament probably included a number of diseases, including psoriasis. Naaman, "the leper as white as snow", whom Elisha recommended to dip seven times in the Jordan, was probably suffering from psoriasis, and his cure by the sulphurous water, which our mounted men found during the Palestine campaign so frequently existed in the waddies of the Jordan Valley, a tribute to the medical rather than the magical power of the prophet.

Many indeed consider that true leprosy did not occur, but the whole circumstances, including the demand for isolation from the congregation under priestly control, all suggest the existence of a contagious disease, even though various skin diseases resembling it were probably included.

One of the most striking features of the middle ages is the great epidemic incidence of leprosy in the twelfth and thirteenth centuries, and still more striking is the definite disappearance of leprosy from England before the sixteenth century. I propose to discuss briefly this remarkable racial experience and analyse to some extent the historical data concerning it.

Strictly speaking, a lazar, following the description of Lazarus in the New Testament, was a person covered in sores. Any chronic and loathsome skin condition, disfiguring or malignant, such as lupus, scrofula, and even erysipelas, might be included. It is, however, probable that in the majority of cases the disease was true leprosy. The medical writers of the fourteenth century, such as Yperman and Gilbertus Anglicus, give undoubted descriptions

[1] Read at the twenty-first meeting of the Australian and New Zealand Association for the Advancement of Science.

of true leprosy. The existence of anæsthetic patches or of hyperæsthesia, together with the disfigured face, raucous voice and mutilated extremities, reinforced by actual paintings of typical lepers by various mediæval artists, leaves no doubt about the matter. We may freely admit that the disease called lepra included other conditions than leprosy, such as syphilis, lupus, and various skin diseases. We may admit, too, that the term "leprosus" included many vagrants who might or might not be lepers. The establishment of hospitals for lepers, so-called lazarets, might at times cater for various types of sickness or infirmity, and the institutions present more the features of a benevolent asylum than a lazaret. Yet, on the other hand, we can fairly infer that for every leper recognized as such there were many others whose disease was less advanced and less obvious, and who would escape attention.

The laws against lepers were in general savagely drastic. The leper was the outcast of society. He was required to wear a sombre gown and cape tightly closed, all but his face being concealed by a hood. Often scarcely able to hobble along, he presented a disfigured face and unsightly eyes as he begged for help with his dish and bell and clapper. In Norman times lepers lost the right to inherit or bequeath property, and at one time in France, under Philip V, lepers were burned on the pretext that they had poisoned wells. False accusations of leprosy might thus lead to various consequences and were the occasion of law suits. John of Gaddesden (1307), physician to Edward II, insisted upon the figure and form of the face being actually changed before a leper should be separated from intercourse with mankind, and he urged the greatest circumspection in this important diagnosis. In 1468, Johanna Nightingale, having refused to retire to a solitary place although considered a leper, the King, Edward IV, caused her to appear before a medical jury, which, after going through over forty distinct signs of disease, pronounced her utterly free and untainted and avowed themselves prepared to demonstrate this in Chancery by "scientific process".

Thanks to the oratorical statement of Voltaire, who said that: "All that we gained in the end by engaging in the crusades was the leprosy, and of all that we had taken that was the only thing that remained with us", the idea has grown that the crusades brought leprosy to Europe. We have other records of lepers, even among Saxon times; and two leper houses were established in 1100, and over twenty before 1150. Queen Maud, in 1101, probably influenced by Archbishop Lanfranc, led the way. It is even recorded that she kissed the face of the lepers and washed their feet. Their humanitarian efforts were reinforced by many noted churchmen, such as Saint Hugh of Lincoln, who, in 1186, strenuously opposed the idea that leprosy was the scourge of God. Certain it is, however, that the time of the crusades was associated with a marked increase in the disease, to which the returning crusaders may quite easily have contributed. Before the end of the twelfth century the Canon *"de Leprosis"* insisted on the proper isolation of lepers, thus following the folk opinion of its contagious character, while in 1276, under Edward III, their presence in London was forbidden. Begging was a privilege they were allowed, though it was forbidden in the city streets in 1369.

The only medical treatment appears to have been given by the barber surgeons. The example of the Pope, Innocent III, in the early thirteenth century greatly stimulated the provision of hospital accommodation for lepers. Many men and women devoted their lives to the care of the poor and the sick and the lepers, renouncing the world and living according to the rule of Saint Augustine. One of the best examples in England is connected with the early history of Saint Bartholomew's Hospital in England. Magdalen College, Oxford, was built on land which originally belonged to the lazaret, the Hospital of Saint John the Baptist, founded in 1231. This infirmary, benevolent asylum and lazaret combined was placed just outside the city wall. Oxford, we may note, already possessed the Hospital of Saint Bartholomew, founded by Henry I for the care of lepers. With the downfall of the monasteries we find William of Waynflete utilizing the obsolete allotment of the lazaret to build his new College of Magdalen in 1447.

Mary Clay, in her book on mediæval hospitals, gives the dates, names, locations and objects of these mediæval institutions, and we find that records are given of 230 leper houses, of which the date of the foundation of 228 is furnished. Three existed before 1100, 80 were established in the twelfth century, 77 in the thirteenth, 58 in the fourteenth, while in the fifteenth and sixteenth centuries only five were established in each century; the vast majority of the others had become obsolete or their functions had changed to look after plague, syphilis or other contagious diseases. By the middle of the seventeenth century lazarets practically fell into disuse and were abolished in France in 1662.

The decrease of leprosy seems to have automatically occurred towards the end of the fifteenth century, though stray cases were still known to exist, and some persistence occurred in Newcastle and in the south-west of England.

In Europe similar happenings are recorded, and in the thirteenth century it is stated that over two thousand leper houses existed. Granting this striking incidence of leprosy in the twelfth and thirteenth centuries, how are we to explain its virtual disappearance by the sixteenth century? One can understand more readily the spread of leprosy than its cessation. Mediæval cities were walled towns into which the population crowded, especially at night time, and lived under extremely insanitary conditions. The first happening was the "black death" of 1348. This plague, almost certainly bubonic plague, provided one of the most disastrous experiences to which the European race has ever

been subjected. With the possible exception of a similar plague during the period of the Antonines, it produced a greater mortality than any epidemic we have on record. It is almost certain that at least one-half of the population of England and of Europe, to the total of over two millions and twenty millions respectively, perished in those dreadful years.

It is remarkable that historians have paid comparatively little attention to the overwhelming influences this experience exercised over the future history of our land. The whole scheme of society was thrown into the melting pot, labour was scarce and labourers demanded better wages. We hear of the high cost of living. We find soon afterwards the disappearance of Norman French and the rise of our English literature, and the end of feudalism; the English peasant ceases to be a villein and becomes a yeoman farmer. Is it too much to suppose that plague, which always tends to be spread by vagrants, would have a heavy toll, especially upon the less resistant lepers, and that it would at the same time indirectly limit the spread of disease by the stimulus it gave to town sanitation. For example, in recent years pneumonic influenza produced a heavy mortality among those with the earlier tuberculous infections and so assisted in the subsequent reduction of tuberculosis.

The second great influence was an improved food supply. Creighton, in his history of epidemics in Britain, records the frequency of famine years, for which, indeed, England was at the time famous. These were due to bad harvests, reinforced by the occurrence of pestilence and also by severe epidemics amongst cattle. Eleven great famines are recorded in the twelfth century, some extending over three or four years at a time, and six in the thirteenth century. In the fourteenth century they become less frequent, the last great famine occurring in 1316. Creighton states that though there were years of dearth and scarcity in the centuries following, there were no great famine pestilences like those of 1196, 1258 and 1315. Ergotism, due to rye fungus, was not rare. Langland, in his fourteenth century of "The Vision of Piers the Ploughman", draws attention to the inadequate diet of the labouring classes.

The third great factor which profoundly affected the whole aspect of epidemic prevalence was the discovery of gunpowder. With the appearance of cannon the old walled cities ceased to house the whole of the urban population at night time. Fortified walls fell too readily before the new artillery, and houses, as we know them today, began to be built in the suburbs. Modern housing dates from the Tudors and may be said to have given the finishing touch to this pestilence. In the Tudor period, thanks to the development of external trade, the diet of English people improved both in quantity and in quality.

The fourth factor is that regulations against leprosy cannot be given an important place because the insidious character of the disease allows patients to reach an infective stage without recognition, and one must admit the effect of drastic regulations in promoting concealment. Isolation hospitals have done much for the welfare of the sick, but little towards the prevention of the spread of disease in a large population. Its local influence in confined groups may be great. Isolation may reduce, but it is difficult to see how it can exterminate, a disease like leprosy.

Certain other facts, however, should be mentioned. We are only slowly gaining knowledge of the behaviour of epidemic disease in a population. In any severe pestilence, no matter how virulent, some persons escape altogether and more recover. The epidemic itself rises to a peak of prevalence and then, for reasons that are often difficult to ascertain, decreases in incidence and within a few weeks or so practically disappears. And this behaviour occurs in diseases over which the control is unknown or, if known, not attempted. It is easy to attribute the improvement to whatever may have been done, whether in leprosy it may have been (as in the middle ages) to killing unfortunate Jews, to building a plague church, to fumigation, or to the more modern methods of today.

In their season certain epidemics return yearly, others reach their maxima in cycles of two or more years. Mumps, for example, every sixth year attacks tens of thousands of children. Yet, though we have no means of control over the disease, no cases, or remarkably few, occur in the interval. But still more striking is the secular trend of epidemics which may prevail for a number of years and then almost vanish, to work up again into epidemic prevalence. Diphtheria is our best modern example, with its epidemic waves in Britain of 1860 to 1864 and 1883 to 1893.

Empires have their day, and so, apparently, have epidemic diseases. Sydenham drew attention to the dominant effect of a disease in a particular year ("epidemic constitution"), as was well shown by the influenzal epidemic of 1919, when all other common epidemic diseases affecting children—measles, scarlet fever *et cetera*—were at a minimum.

So we have had dominant diseases in various centuries. Leprosy in the eleventh to the fourteenth, plague from the fourteenth to the seventeenth, smallpox and typhus in the seventeenth and eighteenth and early nineteenth, cholera in the nineteenth century.

From England some have disappeared apparently never to return in epidemic form: leprosy, plague, cholera, typhus, malaria. Others return again and still again: smallpox, influenza, diphtheria.

Is it possible that a prevailing type of infection, apart from the circumstances that favour it, may unfavourably influence the chances of other infections to reach epidemic prevalence? Such behaviour is known in the plant world when weeds choke out the flowers, and even in bacterial cultures. May, then, leprosy infection, as well as lepers, not have been eliminated by the new forms of infection

which, by replacing leprosy, caused its disappearance? Plague, fourteenth to seventeenth, and perhaps the sweats (? influenza) of the sixteenth century may thus have dominated and eliminated leprosy.

Finally, Archdall Reid's hypothesis of natural selection may assist to explain the disappearance of epidemics by the development of a racial immunity, due to the survival of the fittest. Certainly it seems to explain the virulence, as shown by the proportion of acute cases, and incidence in young people and high fatalities so typical of a new disease in a virgin soil, such as measles in Fiji last century, or tuberculosis.

The relative immunity of more experienced populations may, however, be in part explained by two phenomena. First, as in measles, we gain immunity by the sacrifice of young children; and secondly, as in diphtheria, herd immunity may develop by contact with the microorganism without actual disease being produced. Neither of these two phenomena is likely in leprosy, so that natural selection by elimination of susceptible stocks is the more probable explanation.

To conclude, leprosy has disappeared from Anglo-Saxon communities. It is difficult to believe that any single factor explains this disappearance; rather may we assume a number of factors at work, a combination or combinations of which permitted infection to be successful or effected its elimination. We are still far from understanding the secular trend of these great epidemic diseases of humanity.

Reports of Cases.

TESTICULAR CARCINOMA OF THE EMBRYONAL TYPE, WITH NOTES UPON THE PROGNOSIS OF TUMOURS OF THE TESTIS.[1]

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IN November, 1926, a farmer, aged fifty-two years, presented himself, complaining that for some two or three months he had noticed his right testis gradually enlarging. He had suffered from no pain whatever and would not have sought advice then but for the inconvenience of the enlarged organ. It might have been enlarging for a longer period without his having noticed it. He felt perfectly well and had always been a healthy man; his history gave no suspicion of syphilis, and no injury to the testis could be recollected.

The patient was fat, looked very well, and general examination revealed no abnormality, with the exception of the region complained of. The right testis was found to be a smooth, firm, ovoid object about the size of a duck egg. It was not attached to the skin, there was no tenderness, and the epididymis could not be felt. Testicular sensation was not elicited. The *tunica vaginalis* was felt as a small sac on the front of the tumour and on exploratory puncture was found to contain a small amount of straw-coloured fluid. The spermatic cord was not obviously changed, and no nodules could be felt in it. The juxtaaortic glands in the epigastric region were not palpable.

On November 22, 1926, under ether anæsthesia, I made an incision starting over the inguinal canal and extending down towards the scrotum for about four inches. The tumour was pushed up from the scrotum, extruded through the incision, and then traction was made upon it so as to bring as much as possible of the cord into view. This was divided and the cord and testis removed.

The patient was seen from time to time during the next eighteen months. He always appeared well, and then I went abroad and lost sight of him.

Pathological Findings.—On macroscopical section the tumour was seen to be a homogeneous mass, 6·9 centimetres by 5·0 centimetres by 4·4 centimetres (two and three-quarter by two by one and three-quarter inches). The portion submitted for microscopical section was reported upon by Dr. L. B. Bull as follows:

> Sections show an embryonal carcinoma ("seminome" of Chevassu). The tumour cells are lying diffusely and supported by a fine fibrous tissue stroma. Mitosis is to be seen fairly frequently in the tumour cells. There is no concentration of lymphocytic cells in the stroma, as is so frequent in these tumours, but these cells are present in small numbers scattered diffusely through the tumour mass. The tumour is well supplied with blood vessels, the capillaries and the veins being in close contact with the tumour cells.

For the subsequent history of the case I am indebted to Dr. C. T. Ch. de Crespigny. On October 23, 1929, two years and eleven months after the orchidectomy, the patient consulted Dr. de Crespigny, complaining that for four months he had suffered from a feeling of pressure and distension in the abdomen. He had seen the local medical practitioner, but his condition was not improved by the medicine prescribed. He gradually became worse, lost about a stone in weight, and recently he had vomited three times. On examination his weight was found to be 74·25 kilograms (eleven stone eleven pounds), he was pallid and cachectic looking, his breath was foul, his pulse rate 96 per minute, and his temperature 38·9° C. (102° F.). Examination of the abdomen revealed an enlarged, firm spleen, and between the spleen and the umbilicus, in the left hypochondrium, there was a deep, firm tumour, which moved on respiration. There was no œdema of the feet, and he was otherwise normal. At this stage the blood film was examined for the first time and the red cells showed anisocytosis and polychromatophilia. The white cells did not appear to be increased in number, and the differential count was approximately normal. On November 5 the hæmoglobin value of the blood, according to the method of Sahli, was found to be 56%, the red cells numbered 4,080,000 per cubic millimetre, the colour index was 0·69, the white cells numbered 6,500 per cubic millimetre, and the film was as before. The differential count was polymorphonuclear cells 70%, lymphocytes 11%, monocytes 14%, and eosinophile cells 5%, the picture being one of secondary anæmia. The patient was given deep X ray therapy, and by November 15 he had received a course to the left upper abdomen *viâ* the front, the back and the left side. While in hospital he had periods of pyrexia, each lasting seven to ten days, and the abdominal mass disappeared with the third treatment. On November 20 the hæmoglobin value of the blood, according to the method of Sahli, was found to be 70%, the red cells numbered 4,600,000 per cubic millimetre, the colour index was 0·76, the white cells numbered 3,000 per cubic millimetre, the film being as before, and the differential white count was polymorphonuclear cells 65%, monocytes 12%, lymphocytes 17%, basophile cells 1%, eosinophile cells 5%. On December 10 the hæmoglobin value of the blood was still 70% (Sahli), the film, as before, showing a high proportion of mononuclear cells. A week later the patient weighed 74 kilograms (eleven stone ten and a half pounds) and the general examination revealed no abnormality. The spleen and tumour had become impalpable.

On February 7, 1930, the patient returned, complaining of slight pain in the right hypochondrium, but otherwise

[1] Read at a meeting of the South Australian Branch of the British Medical Association on July 28, 1932.

feeling well. He had a good colour and was fat, and weighed 81·9 kilograms (thirteen stone), an increase of 8·1 kilograms (one stone four pounds). The spleen was just palpable. On March 4 he reported that he had had pain in the epigastrium and pyrexia for a week. The spleen and liver were enlarged. On March 11 a laparotomy was done, masses of glands in the retroperitoneal tissues and subserous deposits in the small intestines were found; one mass was removed and the microscopical picture was that of an embryonal carcinoma.

The patient died ten days later, four years and four months after the orchidectomy.

Comment.

For comparison with this case Dr. de Crespigny has kindly given me the notes of another patient who came under his care. The patient was a labourer, aged forty-six years, who, in 1920, had an enlarged, imperfectly migrated testicle removed. This was histologically reported to be a sarcoma. In June, 1924, his legs had become swollen and caused him to stop work. He was feeling well, eating and sleeping normally, and had lost no weight. On examining his abdomen there were found to be dilated veins coursing over the anterior abdominal wall, and in the mid-epigastric region there was a deep mass of secondary glands. His legs were moderately œdematous. He was given deep X ray therapy, and in three months he was feeling much better, the œdema had almost disappeared, and no mass could be felt in the abdomen. The X ray treatment was repeated at the end of another four months, and at the end of 1926, two and a half years after the recurrence was manifest, he was still alive, and neither mass nor œdema was present.

The fact that the first patient lived some four and a third years after the orchidectomy and that the second was alive and well some six and a half years after a similar operation suggests that the secondary deposits which were present at the time of operation were small and comparatively dormant, and very strongly suggests that the tumours might have been dealt with more effectively in their early stages.

There are three possible ways of dealing with these tumours: (i) by the radical operation of orchidectomy and excision of the epigastric glands [Grégoire (1905), Bland Sutton (1909), Russell Howard (1910) *et cetera*]; (ii) by orchidectomy and subsequent irradiation of the glandular drainage area, the juxtaaortic glands; (iii) by a combination of (i) and (ii).

The complete operation alone may prolong life by two to three years, but is somewhat difficult to perform. I know of no figures to show what may be the increased expectation of life with orchidectomy and irradiation, but it would appear by the marked improvement in the condition of the two patients under consideration when they were subjected to deep X ray therapy, that these tumour cells are very sensitive to X rays. It seems that every effort should be made to eradicate such a fatal disease, and the suggestion is made that the routine treatment should be the radical operation followed by deep X ray therapy applied to the epigastric region; if the patient is very feeble or if extensive metastases have occurred, then palliative orchidectomy alone should be done. Dean[4] reports a case of embryonal carcinoma, the glands not being invaded, though apparently enlarged, in which the radical operation was done, followed by irradiation, the patient being well six years and seven months later. While Barringer[5] and associates have treated testicular tumours with irradiation since 1915, in all, 113 cases, they report that embryonal carcinomata are very radio-sensitive, carcinomata with a tendency to form gland-like cavities less so, and the adult type with tubules or squamous carcinomata are radio-resistant. They use very heavy doses of X rays. Swan[6] likewise reports a case of small round-celled sarcoma in which abdominal metastases occurred two and a half years after simple orchidectomy. These regressed after radon seeds had been buried and deep X ray therapy had been given, and the patient returned to work four months after treatment had commenced.

The prognosis of testicular tumours in general is of interest, and in considering it the classification used by Cairns[1] is followed; most of the tumours fall into two groups: (i) mixed tumours, consisting of tissues of several types; and (ii) spheroidal celled tumours, variously described as seminomata, spermatocytomata, carcinomata and alveolar sarcomata. And to this must be added the sarcomata as described recently by Dew,[3] the source of which he says may be: (i) the mesoblastic elements of a teratoma, (ii) intertubular connective tissue of the testis and epididymis, (iii) the coverings of the testis and spermatic cord, or (iv) blood- or lymph-borne metastatic emboli.

The first group are the teratomata, and with the single exception of the dermoid, the typical teratoma, which contains hair and teeth and is of great rarity [six have been reported in thirty-five years by British surgeons (Bland Sutton[2])], they are extremely malignant. Paget's classical case of a *teratoma testis* which gave rise to secondary deposits of cartilaginous growth, is now well known and, although it has been reexamined and found to be carcinomatous, the apparently benign metastases, reproducing the typical teratomatous structure of the primary growth, show that it would be quite unsafe to regard teratomata otherwise than as metastasizing growths.

Bland Sutton[2] reports a case of a teratoma in which he excised the epigastric glands and performed orchidectomy. Six months later the patient again came under observation with a big lymph gland in the left side of the neck, under the sternal end of the clavicle. This was removed and on section was found transformed into cysts lined by epithelium like that found in the testis. Four years later a lobulated tumour appeared in the left side of the neck, proving on excision to be a mass of similar glands. The patient was in good health five years later.

The spheroidal celled tumours run parallel with the teratomata for malignancy, as will be seen by referring to some of Dew's[3] cases:

1. Case I.—"Mixed tumour with areas of cartilage in a cellular stroma." Recurrence in the perineum occurred in twelve months.

2. Case IV.—"Malignant embryoma." The patient died sixteen months after orchidectomy with malignant masses in the abdomen.

3. Case XVI.—"Typical teratoma with cartilage predominating." The patient developed epigastric pain and a metastasis in the abdomen, and was anæmic and ailing twelve months later.

Cairns,[1] in a careful "follow-up" of cases, found that of 35 patients with atypical teratoma, 22 died of metastases, in 12 cases within six months of the onset of symptoms. The atypical teratoma (in his classification meaning the ordinary teratoma of most pathologists) is one of the most malignant of the tumours known to man, he says. Cairns is in favour of the radical operation, as it can be performed with no added mortality, and Dew says: "The radical operation is now firmly established as the operation of choice in malignancy of the testis."

Summary.

1. A case of embryonal carcinoma of the testis is reported and the marked diminution of the secondary deposits and the prolongation of life under deep X ray therapy are commented upon.

2. Radical orchidectomy with excision of the glands in the epigastric region followed by deep X ray therapy to this area is suggested as the proper routine treatment for cases of malignant tumour of the testis.

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Reviews.

URGENT MEDICAL CONDITIONS.

"MEDICAL EMERGENCIES," by Dr. Charles Newman, is intended as a companion volume to the larger "Surgical Emergencies" of Romanis and Turner Mitchiner.[1] The definition of an emergency is stated in the preface to be a condition in which accurate and prompt treatment are necessary in order to save life or to avoid great suffering. This definition will meet with universal acceptance, but on reflection it will be found to include almost every medical disorder of any gravity or importance. Something of this truth must have been gradually realized by the author, since in a little over a hundred pages he refers to the treatment of no less than approximately one hundred and twenty separate medical conditions excluding the poisons, which rightly constitute the subject matter of the first chapter. The inevitable result is that some of the subjects are inadequately discussed. It is open to question whether there is need for such a book as this, for both the senior student and the junior graduate are alike impressed with the necessity for knowing the fundamentals of treatment of the urgent and dramatic in medicine and usually, too, with the need for knowing its symptomatology. The whole matter is discussed better in larger works traversed during apprenticeship days.

There are so many therapeutic problems opened up that there is abundant room for criticism or even for the rejection of certain methods advocated, but it would be scarcely fair to enumerate these, as the author has had to eliminate his reasons for using them in order to keep the book close to pocket size. To be satisfied with the injection of six thousand units of antitoxic serum in a case of laryngeal diphtheria, to omit any mention of carbon dioxide as a therapeutic agent in a whole chapter devoted to the treatment of asphyxia, not to refer to the induction of artificial pneumothorax in hæmoptysis, not to mention the administration of saline solution to a patient with heat cramps, are a few of the deficiencies. A number of very common "emergencies", such is infantile convulsions and diabetic coma, are not dealt with fully enough. Further, it will always be a pity to see clinical or bedside jargon find its way into English print. The best features of the book are the arrangement of the chapters to facilitate ready reference and also the large readable type. Of the individual sections, the chapter on poisons is the most helpful, but in these days such discussions should always include a list of dangerous proprietary drugs and their composition.

In spite of its shortcomings this book will be of use to the general practitioner who is out of date in his methods and who is anxious to do some easy revision or who trusts his memory so little as to require a *vade mecum* for his bag. The contribution, however, could hardly be said to represent the full resources of the practitioner faced with a medical emergency.

ENGLISH SANITARY LAW.

THE third edition of Dr. Charles Porter's "Sanitary Law in Question and Answer", written in collaboration with Dr. James Fenton, provides a concise summary of English sanitary law.[2] The first edition was published twenty-two years ago, and the growth of public health legislation in the interval is shown by the fact that reference is made in the new edition to no less than fifty-two separate acts of Parliament dealing with public health and preventive medicine, together with their corresponding by-laws, orders and regulations.

The book is intended as a guide to students, particularly candidates for the English degrees and diplomas in hygiene and public health, and as a ready means of reference for officers of the public health services. It should prove of great assistance to those requiring guidance in the vast and often bewildering field of sanitary law.

The subject matter is dealt with by the method of setting out brief questions, with answers in concise and abbreviated form. Although this necessitates a certain amount of repetition, the third edition, though considerably larger than the earlier editions, adequately covers the whole field in the compass of two hundred pages. The print is clear, and the method of cross-references, combined with a very complete index, enables the student to refer rapidly to any of the matters dealt with.

Reference is made in the preface to the proposed consolidation of the public health acts which has been under consideration for some time. The need for similar consolidation in the health legislation of some of the Australian States makes the reference timely, and the comparison between the English law, as set out in the volume, and Australian practice shows unmistakably the need for numerous amendments and additions in our own sanitary code.

The objects of the authors, to provide a concise, thorough and rapid means of reference on points of English sanitary law, to be supplemented, when necessary, by the statutes themselves and larger text books, have been well achieved. The work can be confidently recommended to students and others requiring a handy and practical guide to English public health legislation.

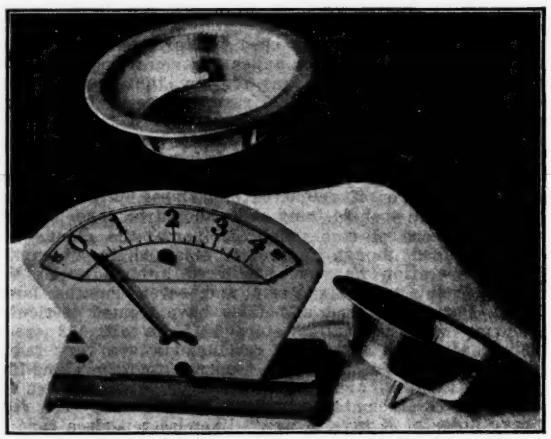
[1] "Medical Emergencies", by Charles Newman, M.D., M.R.C.P.; 1931. London: J. and A. Churchill. Demy 8vo., pp. 138. Price: 8s. 6d. net.

[2] "Sanitary Law in Question and Answer for the Use of Students of Public Health", by C. Porter, M.D., B.Sc., M.R.C.P., and J. Fenton, M.D., D.P.H.; Third Edition; 1932. London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 236. Price: 7s. 6d. net.

Notes on Books, Current Journals and New Appliances.

SCALES FOR DIABETICS.

DR. E. M. HUMPHERY has forwarded the accompanying illustration of small handy scales for weighing food for diabetics. The scales will weigh food up to four ounces,



the tray is detachable for cleaning, the dial is adjustable for accuracy, and it can be packed into a small compass for transport. It may be obtained at the Kolling Institute of Research, Royal North Shore Hospital. The price is 7s. 6d.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 24, 1932.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

SQUINT AND SIGHT SAVING.

PREVENTIVE medicine is not concerned solely with infectious diseases, with mental hygiene and with the conservation of the health of industrial workers. It must cover the whole range of human activity from the cradle to the grave and even before the cradle is reached. Most medical practitioners will agree with this statement. They will also agree that the preservation of eyesight comes within the range of preventive medicine. While all medical practitioners will do their utmost at the birth of a child to prevent infection of the conjunctiva by such organisms as gonococci, while they will take steps to correct an obvious myopia or hypermetropia as the child grows older, it is curious that relatively few know much about squint and that fewer still are seized with the need for early treatment that will prevent loss of sight of the squinting eye. Unfortunately, the belief is prevalent among non-medical people that children may "grow out of" a squint. It is said that medical practitioners have occasionally expressed the same view. This may or may not be true, but it is certain that the laity is not alone in the belief that ophthalmic surgeons will not undertake treatment of a squint in a child until it has reached the age of seven years. By the age of seven the most suitable time for treatment has passed and irreparable damage has often been done.

This is not the occasion for a discussion on the causation of strabismus nor of the amblyopia associated with it. Those who have access to *The Australian and New Zealand Journal of Surgery* will find in the issue of December, 1931, an excellent discussion on the problems of strabismus from the pen of Dr. J. Ringland Anderson. Since parents are sometimes advised to cover up occasionally the child's normal eye, so that it will be compelled to use the squinting eye, it is well to point out that covering up the normal eye of a young child with a squint will in most cases lead to development of full vision in the squinting eye. At the same time, if the occlusion of the normal eye is excessive, its vision may become impaired. It is useless to give general directions to patients or to their parents. The laity must be taught that treatment of squint is a simple matter if it is undertaken early, that neglect will lead to blindness of one eye, and that, though the defect is unsightly, the resulting disability is one not only of appearance, but is of importance from the industrial point of view as well as from that of loss of binocular vision. Most children who receive early and adequate treatment not only recover the vision of an eye which is blind for all industrial purposes, but they also develop binocular vision and gain all the advantages that accompany stereoscopic vision. This raises the question of fusion training.

Of basal importance in squint is a defect in the fusion faculty. The treatment of a squint does not end when an error in refraction has been corrected under atropine, nor when the external muscles of the eye have been subjected to operation. Vision must be developed in the eye that appears amblyopic and then fusion training may be started. Fusion training is a long and tedious business. So tedious is it that in the past many ophthalmic surgeons have been content with cosmetic improvement and neglected visual failure. With improved and controlled illumination and with such instruments as the synoptophore and Maddox's cheiroscope, fusion training has been made easier, and it is now possible for a busy ophthalmic surgeon to hand over to specially trained persons the development of the

power of fusion in squinting children, provided he has made sure that good vision is present in both eyes. A little over two years ago training of this sort was started at the Orthoptic Clinic at Moorfields Hospital, London. A similar clinic was started at the Alfred Hospital Melbourne, not quite two years ago. The results obtained at the Alfred Hospital clinic have been most encouraging; even some children who had developed abnormal retinal correspondence have, as a result of training, attained normal binocular vision. Several workers have been trained for work in other places, and it is hoped that clinics similar to that at the Alfred Hospital will before long be opened at Sydney and Hobart. These workers act under the supervision of ophthalmologists and undertake no work other than that of fusion training; even the development of vision in amblyopic eyes is not part of their duty. The course of training which they undergo comprises study of the anatomy and physiology of the eye, particularly of the ocular muscles, and the use of the instruments necessary for fusion training.

Sight saving or fusion training clinics have come to stay. We would go so far as to declare that they are an essential part of every hospital department at which patients with strabismus are treated. The cry will immediately be raised, nay, has already been raised, that there is no money for purchase of the necessary instruments. Money can be found for other forms of treatment which are not so important. Physical therapy, diathermy machines and massage are provided for treatment of the muscles of the trunk and limbs. Why should the muscles of the eye be neglected? It is at least as important to save children from partial blindness as it is to enable them to walk about. The money must be found. This is the message to hospital authorities. If hospitals are prepared to make provision for fusion training, in other words, to carry the principles of preventive medicine into the ophthalmic departments, medical practitioners in general practice must send their patients to ophthalmic surgeons before the stage most suitable for treatment has passed. Particularly is this true of those patients who in after life are likely to be engaged in industrial processes. This is the message to the general practitioner. When facilities for fusion training are made and the patients are forthcoming, ophthalmic surgeons will carry into practice what they at present realize—that operative correction of squint produces what is far from the ideal result. It is their duty to approach hospital boards so that clinics may be started, and they should set the example by the more frequent adoption of fusion training methods in their private practices. This is the message to the ophthalmic surgeon. If general practitioner, ophthalmic surgeon and hospital authorities do their duty, the "wait and see", or, as some more rightly prefer to call it, the "wait and not see" practice will become a thing of the past and much preventible blindness will be eliminated.

Current Comment.

HÆMOPHILIA.

In the minds of many who have not met with them in the course of practice, the less common diseases may occasion little thought, and, were it not for oddness of symptom or incidence, or for a seeming likeness to or confusion with more everyday conditions, they might remain lost in the backwaters of the memory. Hæmophilia is a rare complaint, though it is often loosely confused, in the minds of those who have for the moment forgotten its singular hereditary transmission, with other conditions in which there is delay in the clotting of the blood.

C. A. Mills[1] has made a survey of hæmophilia which should provoke interest, not only because of the successful methods of treatment described, but also because of the application of discoveries of biochemists working in other fields to the solution of the problem. Of the ætiology of the condition we know nothing. Mills, however, draws attention to the work of Birch as the most important so far reported. Birch, on the assumption that females of hæmophilic families must possess some protective factor against the disease which is lacking in the males, tried ovarian transplants and ovarian extract therapy in hæmophilic males. Apparently remarkable success attended this type of therapy. She then tested the urine of hæmophilic males for the small trace of female sex hormone which is usually found in male urine. In her five cases no trace of this hormone was found. She therefore believes that the disease is kept in recessive form in the female carriers by the activity of their sexual organs. Much work has to be done before her proof is complete. The question arises as to whether there are non-hæmophilic males who excrete no female sex hormone in the urine.

[1] *The Journal of Laboratory and Clinical Medicine*, June, 1932.

The blood of hæmophilics shows few abnormalities apart from its prolonged clotting time. The clotting time may vary from normal limits up to several hours, depending on the severity of the condition and the time at which the blood is taken. The clotting time of a patient's blood may show wide variations from week to week. Prothrombin of the blood in hæmophilia seems to be the only clotting factor exhibiting a definite abnormality. Thrombin, once formed, is normal in amount and action.

It is not necessary to traverse the clinical features of hæmophilia; they may be found in any text book. Reference should be made, however, to Mills's *résumé* of treatment. He divides treatment into immediate and prophylactic treatment. He points out that the first two days offer the best chance of stopping the bleeding, and adds that no time should be lost in applying the most effective means of hæmostasis at hand. Many preparations are marketed as coagulants. Mills prefers purified tissue fibrinogen. He gives it orally in doses of three to five cubic centimetres of a 1·5% solution in cold water, on an empty stomach, half an hour before meals and at midnight. One to two cubic centimetres should be given subcutaneously every two hours for four doses, and thereafter every eight hours. These principles would hold good for any of the biological coagulants in common use. Other procedures to be instituted at once include giving a high protein diet, the induction of a local skin protein reaction, and the subcutaneous injection of adrenaline every four hours, except when the bleeding is arterial. When hæmorrhage has been occurring for a number of days, preparation ought to be made for blood transfusion, but this ought not to be done within eight hours of the administration of a dose of tissue fibrinogen. Prophylactic treatment involves several separate procedures. Sensitization to a foreign protein offers such an immediately effective means of treatment that Mills gives it first place in prophylaxis. The patient is sensitized by intramuscular injection of sheep or hen serum. After two weeks intradermal injection of a drop of the serum is again made. The formation of a wheal denotes proper sensitivity. Should the clotting time not shorten sufficiently after the first skin reaction, the intracutaneous injection may be repeated for several successive weeks in different skin areas. The general sensitivity usually lasts for a year or more and may be subsequently renewed. Mills insists that the production of a generalized systemic protein reaction is to be carefully avoided, since its effect is to produce a temporary hæmorrhagic state which might prove disastrous. Likewise, it would be unfortunate if intended intradermal injections should be given subcutaneously. Mills states that "Theelin", the follicular hormone now on the market, has been found by Birch to be very effective in hæmophilia. He finds, however, no permanency in the effects, as the clotting time begins to mount once the injections of "Theelin" are discontinued. Its main usefulness will be found in the preparation for minor surgical procedures.

The two most interesting features of Mills's paper are the failure of Birch to find female sex hormone in the urine of hæmophiliacs and the prophylactic treatment by sensitization to a foreign protein. An effort to determine whether male persons not affected by hæmophilia excreted no female sex hormone would necessitate observation of many hundreds or thousands of males. The observation that "Theelin" is effective in treatment is interesting in this connexion. The fact that sensitization to a foreign protein is useful in prophylaxis suggests that hæmophilia may have an allergic ætiological factor. The observation, however, does not prove that allergy is in any way concerned with the hæmophilic state. All that it does is to suggest a line of investigation.

THE HEART IN HYPERTHYREOIDISM.

Is the heart actually poisoned in the thyreotoxic state? Is there some special poisoned condition of the cardiac muscle itself due to an excessive or disordered thyreoid secretion, or is the embarrassment of the heart due to sheer overwork? These questions are dealt with by E. C. Andrus and D. McEachern in an article in which they review the evidence, both clinical and experimental.[1] The conclusion they form is that there is no evidence of specific intoxication. *Post mortem* studies are quoted showing that there was a normal myocardium in 14 out of 27 patients dying from hyperthyreoidism, and slight myocardial changes were seen in eight cases only. Moreover, they remark that in a fair proportion of fatal cases the patients appear to "perish in the flame of hyperthyroidism without manifesting signs of cardiac failure".

The experimental evidence is gained from the study of the isolated hearts of thyreotoxic animals, and this indicates that the tachycardia and presumably the more serious cardiac symptoms are due to the metabolic action in thyroxin on the myocardium. According to this view, the heart suffers because upon it falls the brunt of the increased demands of the goaded body, and because it shares in the elevation of the general metabolism. It is easy to understand how a prolonged hyperthyreoidism may thus cause hypertrophy of the heart, provided the blood supply of that organ is adequate, but this does not necessarily connote actual muscle damage. But when the subject of the disease is already suffering from a disabled heart owing to some infective or degenerative process, or when wear and tear have reduced the cardiac reserve to a considerable degree, it will not be surprising if the heart gives way under the strain. The authors put it well when they remark that it is probably most accurate and certainly most optimistic to look upon the hyperthyreoid heart as burdened by its own accelerated mechanism and that of the whole body.

[1] *The American Journal of the Medical Sciences*, June, 1932.

Abstracts from Current Medical Literature.

PÆDIATRICS.

The Allergic Child.

G. BRAY (*British Journal of Children's Diseases*, March, 1932) writes that one-half to two-thirds of the allergy occurring in childhood is inherited. This must be through the germ plasma in the case of the father, but in that of the mother it may be an active or passive transference of sensitiveness through the placenta, and in this instance would have reference to dietetic or therapeutic measures employed by the mother during gestation. The site and nature of the allergy depend on post-natal local injury in the presence of a suitable allergen. In acquired allergy the association must be closer and more continuous; for example, it is often occupational. The features common to all types are their periodicity, nocturnal nature, greater frequency in childhood, positive skin reactions, eosinophilia and hypochlorhydria. The lists of individual manifestations include recurrent bronchitis and asthma, eczema, flexural pruritis, urticaria (papular and giant types), purpura, colic, recurrent vomiting, hay fever, migraine, enuresis, drug or physical sensitization. Epilepsy is excluded, as less than 1% of epilepsy occurs in allergic children. Purpura includes the group with associated urticaria or joint swelling. The cases of enuresis are those resisting the standard methods of treatment; in migraine, abdominal symptoms predominate. Treatment resolves itself into a definite routine. Adrenaline or ephedrine is the standby for the acute attack. Children do not tolerate well the continued administration of ephedrine. Specific treatment by skin test or by elimination diet is usually necessary; good and regular hygienic habits are essential; a well-balanced diet and peaceful surroundings are more helpful than non-specific therapy. Hydrochloric acid given by mouth is useful when hypochlorhydria is present.

Poliomyelitis.

B. C. HECHT, H. J. HARTMAN AND S. W. BOORSTEIN (*Medical Journal and Record*, January, 1932) contribute a symposium on poliomyelitis. Hecht deals with the disease as manifested in a seven-year period at the Grasslands Hospital, New York, wherein one hundred and thirty-seven patients were admitted, including ninety-six in the 1931 epidemic. The greatest number occurred in patients up to the age of three years, and this supports the retention of the name "infantile". A preponderance of males in the ratio of seven to five agrees with the findings of other observers. Hecht states that it is estimated that abortive cases in any epidemic occur to the extent of at least 35% to 60%. Of the prodromal symptoms, vomiting occurred in 53% of cases, upper respiratory signs in 24%, headache in 34%, drowsiness in 46%, irritability in 63%, spine signs in 74%, Kernig's sign in 39%, hyperæsthesia and nerve trunk pains often indistinguishable in 36%, enlarged cervical glands in 41%; sweats, rashes and the positive Babinski's sign were uncommon. The authors are unable to support Draper's contention that a long-framed or Fröhlich type of child is constitutionally susceptible. The usual temperature range was between 37·8° and 39·45° C. (100° and 103° F.) and its height bore no relationship to prognosis. As regards the cell count in the cerebro-spinal fluid, the initial cells were neutrophile cells, replaced in twelve to eighteen hours by lymphocytes. Most counts were below fifty cells, the highest was 1,338, the lowest eight cells per cubic millimetre. Thirty-two patients had lumbar puncture done and no intrathecal serum was given. By the fourth week only 2% of these had a supranormal count, irrespective of its original height. The patient with 1,338 cells recovered without manifesting neurological signs. Conversely, all patients who did badly, had a high cell count. The mortality rate was 15·6%, which corresponds closely to that of other epidemics, no matter what primary treatment was employed. This hospital was supplied with a Drinker apparatus. Sixteen patients were placed in the machine; four lived and twelve died. None of the patients with bulbar symptoms lived, as fluid was sucked by the apparatus through the paralysed larynx. All but one of the patients who lived in the machine had paralysis of both upper and lower extremities. Serum was given by all routes, but no scientific evidence was available of its efficacy, since there were no control cases; and while individual patients seemed to benefit, it was difficult to separate them from primarily abortive cases. The average dose of serum was 70 to 100 cubic centimetres.

Scarlet Fever and the Hæmolytic Streptococcus.

T. TOYODA, J. MORIWAKI AND Y. FUTAGI (*The British Journal of Children's Diseases*, April, 1932) have set themselves three questions. Firstly, is the hæmolytic streptococcus always detected in a scarlet fever patient, or is scarlet fever always associated with the hæmolytic streptococcus? Only seven of 273 cases investigated within five days of onset failed to show the organisms in cultures from throat swabbings. Even in the convalescent stage the positive throat cultures still remained at 44%. Cultures of the organisms were also obtained from the focus of complication or from the heart blood *post mortem* to the extent of 100%. The scale itself contained no streptococcus, but on agar plates left in the sick rooms, streptococci were found in seven out of thirteen instances. The second question is: Are all the strains of scarlatinal streptococci capable of producing Dick toxin? Out of 119 strains of scarlet fever streptococci they found that 89·1% were capable of doing so. The streptococci isolated from an old focus of *otitis media* were incapable. There appeared to be no close relation between streptococci as regards their virulence and their toxin-producing power. This means that streptococci grown from cases already well advanced have their virulence diminished by the patient's immune bodies. Therefore, if they are used for the preparation of Dick toxin, the toxin must be used in a concentration of one in five hundred. The heat-stable endotoxin which causes the pseudo-reaction is correspondingly increased in amount. The third question is: Can the rash be identified by an experimental rash caused by toxin of scarlatinal streptococci? Three Dick positive reactors were selected and 0·2 cubic centimetre of the serum of a convalescent scarlet fever patient was injected intradermally, and this was followed by the intramuscular injection of 0·4 to 0·5 cubic centimetre (4,000 to 5,000 skin test doses) of culture filtrate of scarlet fever streptococci (Dick toxin). A well marked rash, nausea, vomiting, circumoral pallor, and raspberry tongue, all developed, with a neutrophile leucocytosis in each patient. The skin area treated by the serum was free from the rash, and a positive Schultz-Charlton reaction was also obtained by the use of antitoxin. These authors have also shown that the serum or urine of a patient with early scarlet fever contains Dick toxin and will produce a skin reaction in susceptible individuals. They conclude that the toxin in the blood of the patient early in the disease is essentially the same as Dick toxin and has the same antigenic properties.

Prevention of Return Cases of Scarlet Fever.

J. D. ROLLESTON (*The British Journal of Children's Diseases*, April, 1932) refers to instances at the end of last century wherein damages were recovered from metropolitan authorities on the ground that patients had been prematurely discharged from hospital. In 1898, the return case rate was quoted at 1·6% and 80% of primary cases appeared to be associated with discharge from the nose. Cameron, in 1904, quoted a percentage of 4·1 among 16,702 scarlet fever patients discharged. He also stated that return cases were commoner in the winter, that the infecting children were usually aged between five and ten years and had a morbid condition of the nose, and that late desquamation could not be regarded as evidence of infectiousness. Later, it was found (Ker) that return cases were more frequent among home-treated than hospital patients. These facts have been in accord with the author's own experience. For three years he had a return rate of 1·5%

from 2,821 patients discharged from hospital. Only seven of the thirty-nine infecting patients had had no complications. Four weeks was the routine period for hospital detention in the absence of any complication. The return case rate in hospitals using routine nose and throat swabbings and their culture from hæmolytic streptococci is no smaller than in those not employing it. The parents are instructed at the author's hospital not to allow the child to sleep in the same bed as children who have not had scarlet fever, to keep special utensils, towels and toys for the patient, and to keep him or her away from school for a further two weeks.

ORTHOPÆDIC SURGERY.

The Strangeways Collection of Rheumatoid Joints.

R. LAWFORD KNAGGS (*The British Journal of Surgery*, July, 1932), in his report, concludes that the investigation of the intermediate cases in the Strangeways collection of rheumatoid joints in the museum of the Royal College of Surgeons has gradually led him to the belief that osteoarthritis and rheumatoid arthritis are expressions at opposite ends of the same scale of a single disease, which he has reason to think is toxic in its origin. On this supposition, osteoarthritis and rheumatoid arthritis are not separate affections, but simply names by which two groups of characteristic pathological changes are distinguished. When the tissues are healthy and robust, the toxic irritation acts as a stimulus to growth processes and osteoarthritis results. When the vitality of the tissues is poor, definite inflammatory reaction may be excited, and in the event of the tissues being unable to maintain their vitality in the face of such reaction, degeneration or even disintegration results. In either case rheumatoid arthritis develops.

Wire Traction in Fractures of the Lower Extremity.

R. M. CARTER (*Surgery, Gynecology and Obstetrics*, August, 1932) describes the end-results in the treatment of fractures of the lower extremity by wire traction. He has used this method in thirty cases of fracture of the femur and in thirty-six cases of fracture of the tibia or of both bones of the leg, and he has not found it necessary to operate upon any patient in this series. He claims that the end-results are much better than could have been obtained by any other means, particularly in fractures of the femur, and that these results have been secured by much greater comparative comfort to the patient. He is convinced that the length of time required for functional restoration is definitely less when this method of treatment is employed, and he attributes the decrease in the length of time of disability entirely to the excellent condition in which the neighbouring joints and muscles may be maintained during the period of consolidation of the fracture. X ray examination shows that bone atrophy is conspicuous by its absence in patients treated by this method. Close attention to essential detail is important for success, particularly with regard to the position of the splint and to the maintenance of traction at all times. Hospital facilities and surgical experience are indispensable for success.

The Maggot Treatment of Chronic Osteomyelitis.

J. BUCHMAN AND J. E. BLAIR (*Surgery, Gynecology and Obstetrics*, August, 1932) present their impressions of the maggot treatment of osteomyelitis. On the whole, notwithstanding the great deal of work, trials and expense incidental to this method, they are of the belief that the maggot therapy is safe, efficient and productive of good results—results at times so rapid and excellent as to overshadow all other methods available to them. They state that it is merely necessary to watch the daily change in the appearance of the wound, its gradual obliteration without extensive scarring noted in other methods, and the comparative comfort of the patient to realize that the maggots are instituting a superior process of healing. The authors feel, however, that before this treatment is generally adopted, further study and experimentation are necessary to elucidate many problems and questions that arise, and to insure a continuous supply of maggots, upon the success of which will depend the popularity, applicability and success of the treatment.

Fractures of the Neck of the Femur.

A. BRUCE GILL (*Annals of Surgery*, July, 1932) discusses fractures of the neck of the femur and concludes that non-operative methods of treatment of recent fractures will continue to be used in the majority of cases. Of these the Whitman abduction method has given the best results. The author considers that open operation should be the method of choice in selected cases and that the most common causes of non-union are failure in making a diagnosis of fracture and improper treatment of the condition which has been correctly diagnosed. Non-union may be expected in 20% to 25% of patients treated by the Whitman method or by open operation. The rate is low in patients under sixty years and increases rapidly beyond this age. In ununited fracture, if the head is viable and if a fair portion of the neck has survived, union may be hoped for in 75% to 90% by means of an autogenous bone graft or a Smith-Petersen nail. He states that satisfactory union should not be expected in the presence of necrosis of the head, rapid and complete absorption of the neck, and in those patients who have received improper treatment. For this group a reconstruction operation offers a 75% chance of securing good function in patients under sixty years of age. In patients beyond this age its advantages are very doubtful. Arthrodesis of the hip affords relief to some patients after any or all of the above-mentioned operations have failed. If it becomes possible to select early in their history those patients who are doomed to failure of union by any method of treatment, the author believes that an early arthrodesis will avoid months and years of useless treatment and disability.

Intravenous Streptococcal Vaccine Therapy in Chronic Arthritis.

M. WETHERBY AND B. J. CLAWSON (*The Journal of the American Medical Association*, June 4, 1932) report that 80% of chronic arthritic patients treated intravenously with a streptococcal vaccine were clinically improved and that the degree of improvement bore no relation to the degree of reaction following the injection. Improvement was manifested in most cases after five weekly injections. They found that the agglutinating titre of the patient's blood rose during the course of treatment and that improvement as a rule did not take place until the titre had risen to one in 6,400 or more. Among patients who had received treatment, the serum which agglutinated streptococci in dilutions of one in 6,400 or more had a much higher bactericidal power for streptococci than the serum of untreated chronic arthritic patients. The authors state that the height of the agglutinating titre in most cases seemed to be a reliable indicator of the degree of protective immunity to streptococci possessed by the treated patient.

Knee Joint Arthrotomy.

J. J. MOORHEAD (*Annals of Surgery*, July, 1932) reviews the indications for and results of arthrotomy of the knee joint and stresses the analogy between intraabdominal regions and those of the knee joint. He favours wide exposure of the knee joint for exploratory approach in order to make every recess of the joint available. The internal meniscus is more often involved than any of the other structures. The next findings in order of frequency are hypertrophied fat pads, villous excrescences and bone fragments. The ultra-aseptic technique has given primary union in the author's series of one hundred and eighty-six cases, with the exception of four with superficial infection. He considers that the length of the incision is no bar to free active mobilization, and with any form of approach the patient can with safety and profit be encouraged to walk in the first week. Recurrent synovitis is usually due to intrinsic causes, and relief therefrom is more likely to follow surgical operation than physiotherapy, apparatus or drugs. The author advises the use of a tourniquet and lays stress on the necessity of overcoming atrophy of the quadriceps muscle.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held on July 28, 1932, at the Darling Building, University of Adelaide, DR. ST. J. POOLE, the President, in the chair.

Gall-Stone Disease.

DR. IAN HAMILTON read a paper entitled: "Some Aspects of Gall-Stone Disease" (see page 375).

DR. P. S. MESSENT thanked Dr. Hamilton for presenting his paper and congratulated him, both on his choice of a subject and on the excellence of his effort. He agreed with Dr. Hamilton in the need for emphasizing the fact that neither colic nor jaundice was essential to establish the diagnosis of gall-bladder disease. It should also be stressed that the presence of colic and jaundice did not always clinch the diagnosis, especially in the absence of a history of dyspepsia. Dr. Messent always felt cautious about diagnosing biliary disease in the absence of dyspepsia. In Australia particularly they should always exclude the possibility of hydatid infestation. A diseased gall-bladder might cause symptoms which strongly suggested organic disease of the stomach; peptic ulcer or carcinoma of the stomach might be closely simulated. Dr. Messent had seen some patients with a history of "typical hunger pain", probably due to an excess of free hydrochloric acid in the gastric juice. More commonly, at the stage at which they saw patients, there was absence of free acid (due to a gastritis), and carcinoma of the stomach might be suggested. It was, of course, not uncommon to find gall-stones and peptic ulcer coexisting.

It was not generally realized that a painless, persistent jaundice, with marked wasting, might be due to a stone impacted in the common bile duct. In this connexion it should be emphasized that in patients with jaundice wasting might be extreme and rapid, quite apart from any question of malignant disease. Careful observation of such patients might reveal slight variations in the degree of jaundice, but this was not constant. Dr. Messent had operated on three such patients, one of whom had been told two to three years before that she had cancer of the pancreas.

Such cases made laparotomy essential in patients suspected of having cancer of the pancreas. As students they were all taught the risk of mistaking basal pneumonia for abdominal disease; but the reverse mistake was probably more common. Wilkie pointed out the frequency with which crepitations were heard at the base of the right lung in association with acute disease in the upper part of the abdomen. This condition was very common in acute cholecystitis and often led to confusion.

Dr. Messent wished he could share Dr. Hamilton's sanguine view of the results of cholecystography. In his (Dr. Messent's) experience the results had been most unreliable and disappointing. Dr. Hamilton warned them about the danger of morphine masking the signs of peritonitis. He considered that if it were used with discretion, morphine might be a great help in differentiating between pain due to colic and that of a peritonitis. He had not found that it "masked" the muscular rigidity which was the cardinal sign of peritonitis.

Dr. Hamilton quoted Steele as advocating cholecysgastrostomy as the operation of choice in these cases, because of safety and absence of recurrences. Dr. Messent could recollect two cases in which this operation was done, one by Nature (a huge stone ulcerated into the duodenum and caused intestinal obstruction) and one by Sir Henry Newland. In each case the anastomosis had almost completely closed in about six months. This operation should be performed only in persons with almost normal gall-bladders, and even then there would be a risk of obliteration of the anastomosis.

The relative merits of cholecystostomy and cholecystectomy in the treatment of gall-bladder disease were still the subject of considerable discussion. Dr. Messent thought each operation had its value, but considered that in deciding which procedure they should adopt as a routine, they should consider the question under the following headings: (i) Efficiency in curing (*a*) attacks of colic, (*b*) dyspepsia; (ii) freedom from recurrence; (iii) relative risk. He felt that there could be little doubt that cholecystectomy was preferable under headings (i) and (ii). With reference to the risk, with experienced surgeons the risk in cholecystectomy was slightly greater. With an operator who had limited opportunities for abdominal surgery, the risk was very much greater with cholecystectomy. In his opinion, the routine operation for an experienced surgeon should be cholecystectomy, except in certain grave cases in which his judgement indicated that the risk would be greatly increased.

Dr. Messent hoped Dr. Hamilton was not serious when he stated that he thought a right pararectal incision could be extended to the hypogastrium or further without harm. Dr. Messent felt that the abdominal musculature should be treated with the utmost respect. Incisions which cut across muscular or aponeurotic fibres could never be regarded as harmless, and, if used, should be as small as possible, compatible with reasonable exposure. For gall-bladder work he preferred to use a muscle-splitting incision, introduced by the late Malcolm Scott. It gave ample exposure and did not damage the muscular or aponeurotic structures.

DR. H. A. MCCOY suggested that all were probably agreed on the value of cholecystography when there was satisfactory filling of the gall-bladder with dye. In such cases it was possible to indicate almost definitely that the gall-bladder was normal or that calculi were or were not present. It was when no dye entered the gall-bladder or when the gall-bladder shadow was faint that he failed to agree with previous speakers. He did not believe that these "negative" findings in cholecystography were entirely satisfactory. Even a confirmatory examination might fail to exclude such causes of "no gall-bladder shadow" findings as personal idiosyncrasy to the dye or premature evacuation of gall-bladder contents. He asked Dr. Hamilton whether he had discovered in his investigations at the Adelaide Hospital statistics which might disclose the value of cholecystography as a diagnostic aid to the surgeon.

DR. OWEN W. MOULDEN expressed appreciation to Dr. Hamilton for his thorough and painstaking account of the subject of gall-bladder disease, particularly the illustrated record of his work on the pathology and anatomy of the organ. Dr. Moulden said he considered the prime consideration in the determination of whether cholecystectomy should be performed, as against cholecystostomy, in a given case of gall-bladder disease, should be the safety of the patient. This aspect should transcend all others, such as the possibility of the recurrence of calculus formation. If the surgeon, after surveying the organ, felt confident that it could be removed without in any way further endangering the patient's life, cholecystectomy was, in his opinion, the correct procedure. Referring to the technique of cholecystectomy, Dr. Moulden said he would like to stress the importance of two points: Firstly, in the removal of the gall-bladder, he considered the first step should be the isolation and division of the cystic duct. It was during this step in the operation that most disasters occurred. And there was perhaps no abdominal operation which demanded a more deliberate and precise dissection than the isolation of the cystic duct from surrounding structures on some occasions. If this were done first, before the field became soiled, it was less likely that difficulties would be encountered. He objected to the removal from the fundus downwards for this reason. Secondly, the institution of drainage following cholecystectomy by the method first described by Mr. Alan Newton, of Melbourne, was, he considered, a great advance on other methods. The small drainage tube was, to all intents and purposes, extraperitoneal, and post-operative discomfort for the patient was reduced to a minimum. Referring to cholecystography in the diagnosis of gall-bladder disease, Dr. Moulden said he placed the greatest value on it. His first experience of it impressed him very much. In 1926, before cholecystography had established its value, a female

patient was seen who presented a clinical failure which was highly suggestive of subacute recurring cholecystitis. There was jaundice present during the last attack. Cholecystograms revealed a normal gall-bladder. In spite of this, the patient was operated upon. A large duodenal ulcer adherent to the liver was found. The gall-bladder was normal. Since that time every case of gall-bladder disease in which the X ray findings had been considered positive, had proved these findings to be correct at operation. Dr. Moulden then referred to the rôle of the gall-bladder in typhoid fever. Up to 1928 typhoid had been "endemic" at the Parkside Mental Hospital for many years, there always being several cases. An examination of the fæces of all patients who had had typhoid during the preceding twenty-eight years, revealed three "carriers", two of whom were previously unsuspected, whilst the third had failed to return fæces free of *Bacillus typhosus* after six months. Cholecystectomy was performed on these three patients. In each instance the contents of the gall-bladder gave a pure culture of *Bacillus typhosus*. In two of the cases biliary calculi were also present. Repeated examination of the fæces in each case following operation revealed no *Bacillus typhosus*. The institution was free of typhoid for three years. Recently Dr. Moulden had operated on a patient in the third week of typhoid fever. A large tender mass had developed in the right hypochondrium, which proved to be a very large gall-bladder full of pus, and at operation this was drained, and the patient ultimately recovered. Dr. Moulden said that he was indebted to Dr. Hugh Birch for the investigations and notes of the cases mentioned by him.

DR. C. DUGUID said that the risk of cholecystectomy had been stressed, but this could be minimized by attempting to pull the under-surface of the liver into view. He grasped the gall-bladder with heavy Moynihan clamps, placing one above the other and dragging on each in turn. It was remarkable how this helped to bring the ducts into view. It was only in very fat patients and in old-standing cases with adhesions that there was real difficulty, and gall-bladder patients were submitting themselves to operation at an earlier stage than formerly.

He had found cholecystography in recent years of great value in confirming a diagnosis of gall-stones.

It was well to have coronary thrombosis in mind as an alternative diagnosis to an attack of gall-stone colic. Both came on without warning and there need be no previous illness. In both there was epigastric distress, and in both there had been the complaint of a boring pain, as of something too big in the œsophagus.

While pleurisy could simulate gall-stone colic, it was possible to get acute inflammation in the base of the right lung from acute inflammation in the upper part of the abdomen. He had been called to consult in a case in which the patient was taken suddenly and acutely ill with pain and exquisite tenderness in the right quadrant of the upper part of the abdomen. Examination of the lungs showed signs of consolidation in the lowest lobe of the right lung. These subsided under a fortnight, and when the abdomen was opened about ten days later, the gall-bladder came away in the forceps. The area had been completely shut off by adhesions, and it was only necessary to remove the gall-stones and mush lying free in the nest so shut off. The pneumonic condition in this case seemed definitely to be due to a spread from the very acute inflammation in the upper part of the abdomen.

Hæmorrhage had been mentioned as a serious complication. Before 1919 he had drained only the gall-bladder. Since then, in 130 cases he had used drainage in five cases for special reasons; in the others he had resected the gall-bladder, with two cases of hæmorrhage. There had been no death in the series.

DR. J. CLOSE thanked Dr. Hamilton for his paper, in particular for drawing attention to the dangers of hæmorrhage following cholecystectomy. The percentage of the mortality due to this cause was remarkable, and the diagrams of abnormal arteries shown by Dr. Hamilton were very fearsome, though he doubted whether the cystic artery was as frequent a cause as stated. Such a small vessel as it usually was, whether it arose from the hepatic or gastro-duodenal artery, might be over-emphasized. If cut, it bled, and one should be able to grasp it, but if it did not bleed as when torn by the dissector, the retraction of the muscular coat possibly prevented serious bleeding. Did Dr. Hamilton not feel that more often other vessels were responsible for serious bleeding?

Division of the right hepatic artery was, of course, very serious, both on account of its immediate effect and, if it was tied, its ultimate effect on the mortality rate.

Dr. Close thought it possible that the decision between cholecystectomy and cholecystostomy in many cases would some day depend on liver function tests. Cholecystostomy might then be considered necessary as the first of a two-stage operation, just as renal function sometimes decided one to do a two-stage operation in bladder conditions, or obstruction of the bowel compelled one to do a colostomy before proceeding to resection.

In regard to the value of cholecystography, since discussing the matter with Dr. McCoy, it was Dr. Close's practice to repeat the request for X ray examination in order to confirm failure to show an excretion of dye before an exploration of the gall-bladder was suggested.

DR. H. R. POMROY said that he could not agree with Dr. Hamilton that cholecystography was at all times reliable. A positive finding that the gall-bladder was well filled with the dye was reliable evidence that the gall-bladder was affected; but it was to be remembered that a certain small percentage of patients did not secrete the dye through the biliary passages, and so cholecystography was of no value at all in these cases.

Valuable evidence of adhesions fixing the duodenum to the gall-bladder was obtained with an opaque meal. X ray examination then showed that the usual descent of the pyloric end of the stomach when the patient was screened in the upright position, compared with the prone position, did not occur.

With regard to the differential diagnosis, he thought that a great difficulty was the differentiation, in the absence of complete radiological examination, between cholelithiasis and carcinoma of the colon. Both conditions were associated with flatulence and periodical attacks of colic.

In replying to the discussion, Dr. Hamilton thanked the various speakers for their stimulating and very complimentary remarks. As there had been such a wide discussion, it would be impossible to refer to many of the points.

Dr. Messent had inquired about achlorhydria, and in reviewing this Dr. Hamilton said that several authors stated that 40% of those suffering from chronic cholecystitis had achlorhydria, and in his opinion this must be treated by medical means if any hope of a complete cure was to be entertained. With regard to the mistakes between basal pneumonia and gall-stones, Dr. Hamilton said he had once diagnosed acute cholecystitis and gall-stones in a fat farmer, but, not feeling confident of himself, had called one of the older surgeons in consultation. By the time the surgeon arrived the patient had commenced to cough up blood-stained flecks of sputum. He had a basal pneumonia and developed a femoral thrombosis. When nearly well, about three weeks later, he suddenly died of a pulmonary embolism. Dr. Messent also said that long incisions were harmful and he did not like the long paramedian incision, but Dr. Hamilton stated that he had seen a paramedian incision from the ensiform to the pubis with no harm resulting. He would personally prefer to make a second subumbilical incision, if it appeared necessary to search the pelvis in that way.

Dr. Duguid and Dr. Close had both asked about hæmorrhage; the latter seemed somewhat sceptical about hæmorrhage from a cystic artery being serious. Dr. Hamilton said he had the very greatest respect for hæmorrhage in these cases. Fortunately, in none of his own personal cases had bleeding occurred, but he had no doubt that most surgeons met with both operative and post-operative hæmorrhage, which could be very troublesome. In several cases at the Adelaide Hospital hæmorrhage had recently occurred, and between the years 1924 and 1928, in 312 cases there, four patients had had severe or profuse hæmorrhage during the operation, one from the cystic artery, one from a large vein crossing the common duct, one from an abnormally placed gastro-duodenal artery,

and in one the source was not stated; four patients had died of post-operative hæmorrhage, thereby adding over 1% to the mortality. For the treatment of post-operative hæmorrhage, which would be shown by a rising pulse rate, steadily increasing pallor and probably blood coming from the tube (which should always be put in), Dr. Hamilton recommended blood transfusion and early re-operation to search for and control the bleeding at its source, provided that by transfusion and other means the patient could be got into a state to stand the second operation. He would not stand it at all well unless his pulse could be got down to a rate of about 100 per minute.

Dr. McCoy had asked whether the cholecystography statistics of the Adelaide cases were available. Dr. Hamilton said that they were, but unfortunately, only in those patients proved to have gall-stones and only up to the end of 1928. In the 312 cases that he had studied, cholecystography was done 29 times, with the following results: One gall-bladder was reported as normal, stones apparently not being observed. Two gall-bladders were faintly seen, stones apparently not being observed. Twenty-three gall-bladders were not seen and so were diagnosed as probably pathological. One gall-bladder and calculi were shown. Two patients were not reported on. This actually worked out that the correct diagnosis was made twenty-four times in twenty-nine cholecystographs.

Liver Treatment of Pernicious Anæmia.

DR. A. R. SOUTHWOOD demonstrated a series of charts illustrating the results of treatment of patients suffering from pernicious anæmia.

The first of the series, a man of fifty-four years, was given cooked liver by mouth, half a pound per day. Before treatment, in August, 1928, the red cell count was 1,500,000 per cubic millimetre, hæmoglobin value 39% (Sahli), reticulocytes 2% of red cells. The typical increase of immature cells occurred promptly after the administration of liver. The reticulocytes on the twelfth day of treatment were 27% of the red cells; they fell to 7% on the seventeenth day and to 1% after four weeks' treatment. The red cell count, performed twice each week, showed a steady rise, reaching 3,600,000 per cubic millimetre in four weeks and 4,500,000 in seven weeks. Hæmoglobin value reached 80% (Sahli) after four weeks of liver feeding. Dr. Southwood pointed out that this was the type of response to be expected in pernicious anæmia patients; failure to obtain it should cause the physician to review the diagnosis. This patient was discharged from hospital in eight weeks and instructed to continue the liver feeding. Insufficient liver was taken; the man was readmitted to hospital in March, 1932, with a blood picture of pernicious anæmia again and signs of degenerative lesions in the cord. The red cells were 2,290,000 per cubic millimetre, the hæmoglobin value was 64% (Sahli). Liver feeding, the usual half pound each day, was resumed. Massive doses of iron were also given with 4·8 grammes (eighty grains) of the saccharated carbonate three times each day, a modification of the method of Sargant. Within five weeks the red cell count reached 4,900,000 per cubic millimetre and the hæmoglobin value 100% (Sahli). There was remarkable improvement in the gait. On admission the patient had been unable to walk without assistance from an attendant. After two months he could walk fairly steadily unattended.

The second patient, a man of fifty-eight, was admitted to hospital in August, 1928. On the suggestion of Dr. Eugene McLaughlin, of the Adelaide Hospital Laboratory, it was decided to test the response to parenteral administration of a liver preparation. At that time no suitable product was on the market, and Dr. McLaughlin prepared an extract of liver for the purpose. An injection was given on each of five successive days. The extract had an irritating effect on the tissues at the site of injection and the treatment was stopped. Enough had been given, however, to elicit a definite bone marrow response. After nine days the reticulocytes were 14% of the red cells. Cooked liver was then given by mouth and the further improvement was maintained. The patient remained well till May, 1930, when he developed lobar pneumonia. The blood picture was at this time: red cells 5,580,000 per cubic millimetre, hæmoglobin value 95% (Sahli), leucocytes 22,500 per cubic millimetre. He died on the fourth day of the illness.

The third patient was severely ill. The red cells were 860,000 per cubic millimetre; hæmoglobin value was 18% (Sahli). Eighteen ounces of blood were given by transfusion, and liver extract (Burroughs, Wellcome and Company) was administered orally. Reticulocytes increased to 25% of the red cells by the eleventh day. The hæmoglobin value reached 78% (Sahli) in seven weeks from the beginning of treatment. In the later stages of treatment, when the red cells count was relatively high and the colour index below 1·0, large doses of iron were found desirable as an adjuvant to liver feeding. Iron and ammonium citrate, 2·0 grammes (thirty grains), was given three times a day.

The fourth patient was a man of forty-eight years. In May, 1932, the red cells numbered 1,100,000 per cubic millimetre; the hæmoglobin value was 30% (Sahli). "Hepatex" "P.A.F." was given intravenously, and a good reticulocyte response followed. After injections had been given each day for a week, the man was able to take liver extract by mouth. In five weeks the red cells were 2,000,000 per cubic millimetre; the hæmoglobin value was 42% (Sahli). In seven weeks the hæmoglobin value reached 65%. The administration of cooked liver and iron mixture by mouth was being continued.

The last patient was a young man of twenty-six years, under the care of Dr. L. J. Pellew. He looked extremely ill; the red cells were 1,380,000 per cubic millimetre; the hæmoglobin value was 26% (Sahli); the leucocytes numbered 3,750 per cubic millimetre. It was at first thought that transfusion of blood would be necessary. However, the response to intramuscular injections of Gänsslen's extract ("Campolon"), one ampoule of two cubic centimetres *per diem*, was excellent, and transfusion was not required. On the seventh day the reticulocytes reached the very high figure of 41% of the red cells. After two weeks' treatment the red cells were 3,400,000 per cubic millimetre; the hæmoglobin value was 50% (Sahli); the leucocytes numbered 6,500 per cubic millimetre. After five weeks the red cells reached 4,980,000 per cubic millimetre; the hæmoglobin value was 75% (Sahli); the leucocytes numbered 10,000 per cubic millimetre. By this time the patient looked quite well; his complexion was florid, the appetite was good, and diarrhœa had subsided. Dilute hydrochloric acid, 4·0 mils (one fluid drachm) after each meal, had been given from the beginning of treatment. Cooked liver was now given and the iron treatment continued. The intramuscular injections gave no discomfort whatever, and the rapidity and height of the reticulocyte increase was the greatest attained in Dr. Southwood's series of cases.

Endometrioma of the Ileum.

DR. C. DUGUID showed a section of ileum which he had resected because of obstruction due to an endometriomatous puckered scar at a point 8·75 centimetres (three and a half inches) from the caecum. The thickened scar tissue was 3·1 centimetres (one and a quarter inches) long, and opposite it the bowel bulged out in the form of a blister. A large right ovarian endometriomatous cyst was densely adherent to lateral wall of the pelvis, the back of the uterus and the front of the rectum. There was a similar but smaller cyst of the left ovary. The front of the uterus was fused to the posterior surface of the bladder by an endometriomatous implant.

The uterus was nodular from fibromata and there was a large internal polypus growing from the fundus. A long and thickened appendix was removed, the chocolate cysts were freed and removed, and a subtotal hysterectomy was done before the resection of the bowel. Lateral anastomosis was then performed. The patient, aged fifty years, made an uninterrupted recovery.

Tumour of the Testis.

DR. IAN HAMILTON reported a case of tumour of the testis. This report is published on page 390.

A TESTIMONIAL TO DR. C. H. MOLLISON.

IN July, 1932, the Council of the Victorian Branch of the British Medical Association decided to show its appreciation of the vast amount of work done during the past thirty-seven years by Dr. C. H. Mollison, as Honorary Treasurer of the Branch and of the Medical Society of Victoria. Dr. Mollison, as is well known, has served the medical profession in many other ways. The Council decided to have his portrait painted in oils and to place it in the Medical Society Hall; a presentation is also to be made to Mrs. Mollison. The appeal of the Council met with a full and ready response. The fund has been closed, and Mr. W. B. McInnes, the well-known Victorian artist, has been entrusted with the painting of the portrait. Dr. Mollison has been a tower of strength to the Victorian Branch, and medical practitioners throughout the Commonwealth will rejoice to know that his efforts are being recognized.

Correspondence.

MEDICAL HISTORY.

SIR: I have read the presidential address of Dr. Benson with mixed feelings. There are several statements which are incorrect and misleading which I think ought to be corrected.

Dr. Benson has been unfortunate in choosing as his authority for medico-historical facts the work by Dr. McFie, which is unreliable and inaccurate and at least twenty-five years behind modern historical research, and which was written purely as a popular history for the layman.

Firstly, the gynæcological and veterinary scripts of the Petrie collection date back to the Middle Kingdom, namely, 2160 to 1788 B.C. The recently described Edwin Smith papyrus which has been described by Garrison as "the most valuable papyrus in respect of actual content", antedates the Ebers papyrus.

Secondly, I cannot allow the statement that Aristotle "was evidently of the cheap-jack class, and could be compared with the garrulous quack of the present day" to pass without voicing my disapproval. May I inquire where Dr. Benson obtained this estimate of the work of the greatest intellect the world has produced?

Aristotle, "the master of those that know", was, next to Hippocrates, the greatest scientific name; and, to quote Garrison, gave to medicine the beginnings of botany, zoology, comparative anatomy, embryology, teratology, and physiology, and the use of formal logic as an instrument of precision".

The great Darwin wrote in 1882: "Linnæus and Cuvier have been my gods, but they were mere schoolboys to old Aristotle." Osler says: "The history of the human mind offers no parallel to his career." This is the great genius whom Dr. Benson and Dr. McFie say was in the cheap-jack class! In what class are the rest of us everyday doctors?

To continue quoting from all the greatest authorities would be only tedious; I will only quote the words of the German historian Baas, who is one of Dr. Benson's authorities: "To estimate the activity of Aristotle, to explain his relation to, and to exhibit his agency in, the formation of the human mind, this is to give the history of all science and art, and to describe the whole political life of the ancients; and such a work would demand a mind like that of Aristotle himself!" Would that we had more quacks like Aristotle in the medical profession today!

3. Galen was not born in Greece. The city of Pergamum was the capital of the Roman Province of Asia and was in Asia Minor a few miles from the modern city of Smyrna.

4. To state that the influence of Paracelsus did not persist is quite wrong. The contributions of Paracelsus to chemical medicine alone and his introduction of mineral drugs, such as calomel, and compounds of zinc, sulphur, iron and antimony still influence medical treatment. He wrote many volumes, and his works at the present time are being edited by Sudhoff, the greatest of medical historians, in about twelve large quarto volumes. The true merits and services of Paracelsus, long hidden under a cloud of charlatanry and misrepresentation, are rapidly being recognized.

Why repeat a foolish legend that the death of Paracelsus was caused by ruffians hired by jealous physicians? A slander on the medical profession. Paracelsus died after suffering from gradually failing health on September 24, 1541, in the Gasthuis zum Weissen Ross at Salzburg after dictating his last will in the presence of seven witnesses, and was buried in the Church of St. Sebastian in all solemnity.

5. The statement that Hipprocrates actually used the words "circulation of the blood" is quite misleading. This meaning given to the Greek original has been shown to be erroneous and even McFie hastens to qualify his statement in his next sentence.

Is it not time, now that the study of medical history has been placed on a scientific basis and many sound works on the subject exist, that those who venture on historical discourses should verify the statements made by fifth-rate historians, before they send them forth once again as true?

Dr. Benson's address forms one more argument for the necessity of teaching medical history in our medical schools, if only to prevent future presidents of branches of the British Medical Association from perpetuating false and misleading medico-historical legends.

Apologizing for taking up so much of your space.

Yours, etc.,

L. COWLISHAW.

Lindfield,
New South Wales,
August 19, 1932.

ALEUCHÆMIC LEUCHÆMIA.

SIR: While reading Dr. Cotter Harvey's report on a case of aleuchæmic leuchæmia in the August 20 issue of this journal, one is impressed by the interest and care he has taken in investigating this type of condition. He states in his summing up that: "It is noted that sepsis, though constantly present, did not in any way determine the issue." It is somewhat difficult to understand on what grounds such views are arrived at. In certain quarters men have recorded that septic throats have been the starting points of these and allied blood conditions. We are aware that organisms invade certain tissues, having affinity for such. It would be very stupid of us to ignore the fact that at times lymphatic reticulo-endothelial tissue and bone marrow must of a necessity be invaded likewise. It is a very simple matter to conjure up in our minds what is likely to happen in such an event taking place. The invasion of tissue can have two actions on the cells involved. There will either be overproduction of their function or destruction with loss of normal function; this, of course, will vary with the virulence or otherwise of the invading organism and the powers of resistance on the part of the individual. Such variations will naturally produce different clinical pictures, but that does not mean that they must be classified as distinct diseases. It seems a far saner view to take, to try to find that relationship between these different types than to point out the difference. There are very few pathological changes except such as are produced by bacterial toxins. It is well known that bacterial infection causes enlarged glands, and have we any reason to think that any other factor exists which is capable of producing such, except malignant invasion? I would suggest that isolation of organisms and inoculation in animals, as followed out by Rosenow, might show some specific elective affinity for marrow or lymphoid tissue in such cases, and so put an end for all time as to the doubt or otherwise as to the causation of these conditions. It is not even necessary that the organism be specific, as it is possible for a variety of organisms to develop a specificity for such tissues. For years people have been most persistent in saying that they did not believe that goîtres were due to bacterial invasion, yet

they were curable by removal of infections and now it is possible to isolate an organism from them.

There is very close parallelism between goître, Hodgkin's disease, lymphadenoma, and splenic enlargement, with polycythæmia and the leuchæmias; in the one case the cell multiplication is confined to a capsule and in the other it is liberated into the blood stream. We must sooner or later accept the fact that all body tissues can be irritated to overproduction or impaired in their action and that bacterial invasion is the commonest cause. Such a simple belief, and there seems no doubt about the truth of it, is going to clear up the mystery surrounding the causation of many obscure diseases. We have already had some excellent work done by Utz and Keatinge on Hodgkin's disease out here and much done in other parts of the world to make us inclined to accept the view of bacterial invasion as the causative factor in these and allied conditions.

Yours, etc.,

SYDNEY PERN.

12, Collins Street,
Melbourne,
August 25, 1932.

"AVERTIN."

SIR: In THE MEDICAL JOURNAL OF AUSTRALIA, August 27, Dr. Idris Morgan, writing on the subject of "Avertin", upbraids me for not recording facts, and implies that I am not scientific in my deductions.

In the first place, the object of my letter was not to record so much what I know as what I feel, and, as medicine is concerned as much with feelings as with facts, I do not think I have transgressed the bounds of useful contribution to the discussion.

In the second place, as to not being scientific in assessing the value of an anæsthetic, I think it is very difficult to apply scientific criteria to such abstract phenomena. The only observations translatable into scientific fact are mortality figures. The other factors to be considered are essentially abstract. Such, for example, are the patient's comfort, the surgeon's convenience and peace of mind, and the anæsthetist's equanimity and control of the situation. It would indeed be difficult to apply the scientific method to observing and recording such very uncontrollable factors.

Several people have said, in effect, that as the result of some experience they consider that "Avertin" does not fulfil the above requirements, and that consequently they do not like it as an anæsthetic. They might with equal right say they do not like vodka as a drink, and nobody would ask them to give scientific reasons for their disapproval. It is enough that for one or other reason it has made a bad impression on them.

What we are confronted with is not the problem of reducing the mortality under anæsthesia, for surely with properly administered ether there is no such problem, but the problem of increasing the all-round comfort of everyone concerned, and this essentially is surely a matter of taste.

Yours, etc.,

DOUGLAS MILLER, F.R.C.S.

185, Macquarie Street,
Sydney,
September 7, 1932.

POLIOMYELITIS.

SIR: In my letter published in your issue of September 17 the words "per cubic millimetre" were inadvertently omitted after "less than four cells" in discussing the normal cell content of the cerebro-spinal fluid.

Yours, etc.,

KAREN HELMS.

135, Macquarie Street,
Sydney,
September 17, 1932.

Obituary.

JAMES WILLIAM FLORANCE.

DR. JAMES WILLIAM FLORANCE, whose death, as previously recorded, occurred on July 21, 1932, was known throughout the State of Victoria as a capable and zealous practitioner. He started life severely handicapped, for he could not walk till he was eight years of age. He later on went to Castlemaine Grammar School, where he acquired a love for classics, which never left him. He then went to Bendigo High School and studied under Mr. Slack, who was a stern disciplinarian and a sound teacher of languages. His stepfather wanted him to become a bank clerk, but clerical work was repugnant to him. He was sent to the Bendigo Hospital to "try his hand at bandaging" and this turned his mind to medicine. He became a student at the University of Melbourne and graduated, top of his year, in 1882. He took the degree of Doctor of Medicine in 1885. He first of all started practice at Shepparton. After a year or two he succeeded to a practice in Mooroopna. He soon became attached to the Mooroopna Hospital. He did a great deal for this institution; it developed, during the period of his association with it, into one of the most important hospitals in Victoria. He worked actively at Mooroopna Hospital until 1927, and from then till his death was its Honorary Consultant. He was a man of high ideals, who did his best to live up to them.

Dr. J. Harbison writes:

Though I knew the late Dr. J. W. Florance well from his earliest student days at the Melbourne University, it was only in 1892, when I entered practice in Numurkah, that we met professionally.

He began with the medical course, which my brother was taking, and I began with an arts course, but the earlier years of both courses threw the students together, and our friendship began.

By 1892 he was settled at Mooroopna and in charge of the hospital, which he had been very keen on securing. Soon we medical men up and down the valley were glad to avail ourselves of his experience in consultation and at operations. The distances travelled were often long and tedious, the roads uncleared of timber, and the tracks very muddy in winter and dusty in summer. No rapid motor cars then, but buggy and horses, or even the saddle on dark nights.

On one occasion, when he came to meet me in consultation some eighteen miles from Mooroopna, horses and buggy were not handy, and Dr. Florance pushed through on a bicycle. When the roads became too muddy he lifted his bicycle over the fences and rode along the paddocks till the road was again passable. But he always got there! He was ever ready to help us, caring little for the security of his fee (no large one at that time), but more for the safety of our patient.

As years went by he acquired new literature and delved deeply into it, secured the newer instruments and appliances, and used them deftly, till we knew that there were few more capable surgeons out of Melbourne.

But the Mooroopna Hospital was always his first love, and it developed, under his enthusiastic guidance, into one of the largest and finest hospitals in the State.

He had formed a Goulburn Valley Medical Society, which afterwards became associated with the Victorian Branch of the British Medical Association, and, as Secretary, he was enthusiastic and generous in bringing together the various members for demonstrations and the reading of papers on subjects of interest. He was especially anxious to establish cordial relations between our members, and we esteemed him highly for it. Of later years he acquired as partner his cousin, Dr. Annie Bennett, who joined in the general hospital work, while a fine private hospital, built opposite the general hospital, gave them opportunity to treat their private clientèle.

Then, as he drew out of the heavier hospital work, he took enthusiastically to X ray work and built in a magnificent X ray plant, which is a great boon to the hospital and to the valley generally.

After a severe operation some few years ago he grew strong so rapidly that we thought he had many years before him. Last year his many friends subscribed to have his portrait painted by Sir John Longstaff and presented it to him. He at once handed it over to the President and Committee, to be hung in the Board Room.

His wise head and genial presence will be sadly missed in the Goulburn Valley, where he lived his life, and we older surviving members of the profession mourn a devoted friend who became part of our life during the long years that we worked together.

Dr. G. R. Reid writes:

I first met the late Dr. J. W. Florance when he was one of the Resident Medical Officers at the old Melbourne Hospital in 1883; and the next time was in 1889, when he lived in Shepparton, but was one of the Honorary Surgeons to the Mooroopna Hospital.

About the year 1891, Dr. C. J. Trood resigned from the position of Medical Superintendent of the Mooroopna Hospital, and Dr. J. W. Florance was appointed in his place and held this position until about six years ago, when he was appointed Honorary Senior Surgeon, which position he retained until his death on July 21, 1932.

He was first Secretary of the Goulburn Valley Medical Association, which he started, and which held its meetings at Mooroopna; the late Dr. J. V. Heily, of Rushworth, was the President. It is now called the Goulburn Valley Subdivision of the Victorian Branch of the British Medical Association.

At that time the number of members was about twenty medical men who practised in the Goulburn Valley from Seymour to Tocumwal. He was a splendid surgeon and was called into consultation by all of us within fifty miles of Mooroopna.

He was very popular, and it was always a great pleasure to all the members to attend a meeting at Mooroopna, when he always gave us a good day's work in the hospital and read interesting papers to us.

We older men owe much to him and will miss him very much, as he was a sterling friend, being of a very happy disposition. His wife only died a few months ago, after many years in hospital. The deepest sympathy is felt for his daughter and two sons in their bereavement. He was in partnership with Dr. Bennett in Mooroopna for about ten years.

GEORGE REDFEARN HAMILTON.

WE regret to announce the death of Dr. George Redfearn Hamilton, which occurred as the result of an aeroplane accident on September 18, 1932, near Byron Bay, New South Wales.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Act of* 1925, of Queensland, as duly qualified medical practitioners:

Graham, Alexander William, M.B., 1924 (Univ. Sydney), Bundaberg.

Osborne, John William, M.B., B.S., 1928 (Univ. Sydney), Southport.

Shallard, Kenneth Boulton, M.B., Ch.M., 1924 (Univ. Sydney), Boonah.

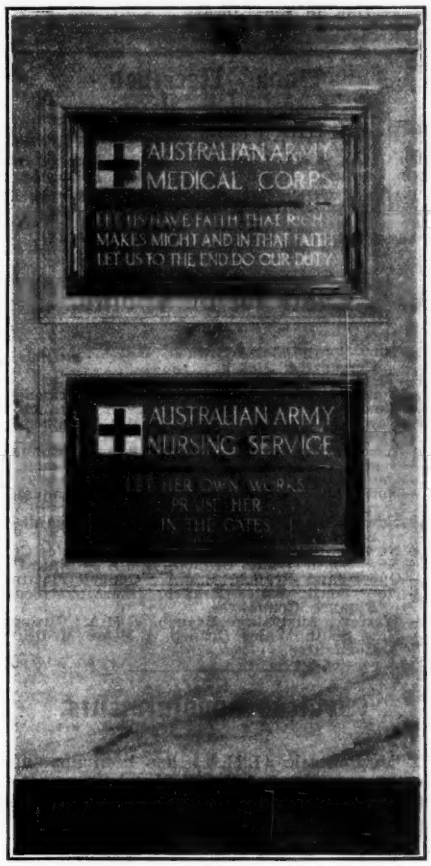
Additional qualification:

Bevington, William Macfarlane, D.P.H., 1930 (Univ. Sydney), Thursday Island.

Naval, Military and Air Force.

MEMORIAL IN BRISBANE.

ON March 3, 1932, His Excellency Sir John Goodwin, Governor of Queensland, unveiled tablets as a memorial to the Australian Army Medical Corps and the Australian Army Nursing Service. The tablets, which were placed in a hall under the Anzac Memorial Building in Brisbane, are shown in the accompanying illustration. The Aus-


AUSTRALIAN ARMY
MEDICAL CORPS
LET US HAVE FAITH THAT RIGHT
MAKES MIGHT AND IN THAT FAITH
LET US TO THE END DO OUR DUTY
AUSTRALIAN ARMY
NURSING SERVICE

tralian Army Medical Corps tablet was erected by subscription, principally from "returned" officers of the Corps.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on September 5, 1932.

The executors of the estate of the late Mrs. Violet A. Easterbrook, of Manly, forwarded a cheque for £100 as a bequest to the University for cancer research purposes. The gift was accepted with grateful thanks.

The Senate has appointed Mr. W. A. Selle, M.A., as Acting Vice-Chancellor during the absence on leave of Dr. R. S. Wallace, and Mr. Geoffrey Dale, B.Ec., was appointed as Acting Registrar for the same period.

The following appointments were approved: Mr. D. P. Mellor, M.Sc., as Lecturer and Demonstrator in Chemistry;

Miss M. Smyth as Assistant Recorder in the Department of Anatomy.

On the recommendation of the Library Committee, the following new regulation was adopted:

> Whenever a University prize or scholarship or higher degree is awarded for an essay or thesis, the original of the essay or thesis shall be deposited in the Fisher Library. In the case of a lower degree, the Library shall accept and catalogue the essay or thesis if the Chief Examiner or the head of the department concerned considers it of sufficient importance to justify its permanent preservation in the Library.

Books Received.

MEDICINE AND THE STATE, by Sir Arthur Newsholme, K.C.G., M.D., F.R.C.P., with a foreword by William H. Welch, M.D., LL.D.; 1932. London: George Allen and Unwin Limited. Demy 8vo., pp. 299. Price: 5s. net.

THE FRANCIS TREATMENT OF ASTHMA, by Alexander Francis, M.B., B.Ch., B.A., M.R.C.S.; 1932. London: William Heinemann (Medical Books) Limited. Demy 8vo., pp. 159. Price: 7s. 6d. net.

Diary for the Month.

SEPT. 27.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 28.—Victorian Branch, B.M.A.: Council.
SEPT. 29.—South Australian Branch, B.M.A.: Branch.
SEPT. 29.—New South Wales Branch, B.M.A.: Branch.
OCT. 4.—New South Wales Branch, B.M.A.: Council.
OCT. 5.—Victorian Branch, B.M.A.: Branch.
OCT. 5.—Western Australian Branch, B.M.A.: Council.
OCT. 6.—South Australian Branch, B.M.A.: Council.
OCT. 7.—Queensland Branch, B.M.A.: Branch.
OCT. 7.—New South Wales Branch, B.M.A.: Annual Meeting of Delegates of Local Associations.
OCT. 10.—New South Wales Branch, B.M.A.: Organization and Science Committee.
OCT. 11.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 13.—New South Wales Branch, B.M.A.: Clinical Meeting.
OCT. 14.—Queensland Branch, B.M.A.: Council Meeting.
OCT. 18.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
OCT. 19.—Western Australian Branch, B.M.A.: Branch.
OCT. 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments.

Dr. D. McG. Steele (B.M.A.) has been appointed, pursuant to the provisions of the *Workers' Compensation Act*, 1928, to be a Certifying Medical Practitioner at Mitiamo, Victoria.

* * *

Dr. F. W. Fay (B.M.A.) has been appointed a member of the Board of the Hobart Public Hospitals District, Tasmania.

* * *

Dr. W. L. Reid has been reappointed a Resident Medical Officer at the Adelaide Hospital, South Australia.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes*, sought, etc., see "Advertiser," page xiv.

CANTERBURY DISTRICT MEMORIAL HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Consultant Urologist.

HOBART PUBLIC HOSPITAL, HOBART, TASMANIA: Junior Resident Medical Officer.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Temporary Honorary Assistant Ophthalmic Surgeon.

THE UNIVERSITY OF SYDNEY, NEW SOUTH WALES: Dental Research Scholarship.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Mines. Toowoomba Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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